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United States
Department
Agriculture
Forest Service

Forest Resource
Report No. 25

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Effects of State and Private Programs on Forest Resources and Industries in the South



This report is a supplement to Forest Resource Report No. 24, "The South's Fourth Forest: Alternatives for the Future," a comprehensive analysis of the timber situation in the 12 Southern States prepared by the Forest Service in collaboration with State forestry agencies, forestry schools, and forest industries. "The South's Fourth Forest" is available for purchase from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, in both paperbound and microfiche.

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United States
Department of
Agriculture

Forest Service

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December 1989

Impacts of State and Private Programs on Forest Resources and Industries in the South

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Contents

	<i>Page</i>
Early Interest in the Forest Resources of the States	
of the States	1
Natural Resources Conferences	3
Southern Forestry Congresses	5
The Weeks Law	8
The Beginnings of Effective State Forestry Efforts	
North Carolina	15
Louisiana	16
Alabama	16
Texas	17
Virginia	18
Tennessee	19
Georgia	20
Oklahoma	21
Mississippi	22
Florida	23
South Carolina	23
Arkansas	24
National Association of State Foresters	25
Clarke-McNary Act: Expanded Federal Cooperation and Support	
Controversy: Federal Regulation of Private Lands	27
The Move for Consensus	30
Clarke-McNary – A Milestone	31
The Depression Years	37
Forest Survey	38
Civilian Conservation Corps	39
Tennessee Valley Authority	43
Norris-Doxey	46
Continued Federal Acquisition	47

World War II	50
After the War	54
Aviation in Fire and Pest Control	55
Nurseries and Regeneration	56
Landowner Assistance	66
Pest Control	68
Resource Conservation and Development Program ...	69
Rural Community Fire Protection Act	69
Interstate Fire Compacts	70
Other USDA Programs	71
Initiation of State Incentives Programs	71
Virginia's Regeneration Program	72
Other State Incentives Programs	74
Virginia's Seed Tree Law	75
Today's State Forestry Programs	77
Rural Forestry Assistance	78
Forestry Incentives	79
Insect and Disease Control	80
Urban Forestry Assistance	82
Rural Fire Prevention and Control	84
State Forest Resource Planning	86
Environmental Programs	88
"Free" Public Assistance	89
Looking Ahead	93
Literature Cited	95
Literature Cited – Unpublished	100
Directory of Personal Communications	101

Early Interest in the Forest Resources of the States

The North Carolina Act of 1777 was one of the earliest expressions of concern about forest fires in the South. But the concerns reflected in that law and most of the other State laws for the next century were about protection of homes, buildings, livestock, and turpentine-boxed trees. Such laws were not passed to protect the forests for the production of timber, clean water, or amenity values (Goodwin 1969, Kinney 1917, Winters 1950). However, there was some interest in controlling the harvesting of trees. In what is now Texas, on November 24, 1827, the Congress of the Mexican Confederacy passed a law requiring six towns along the Sabine River to take out permits to cut timber. They were permitted to cut timber without paying taxes, but they had to cut during the tree-planting season. If they negligently caused fires, they had to pay for any damage and plant trees on the burned areas (Kinney 1917).

By 1900, all Southern States had laws on the books prohibiting acts ranging

from willful or careless setting of fires and "fire hunting" to timber trespass. Many of these laws had been enacted during the first half of the 19th century. Several specified penalties for careless or malicious setting of fires. Some provided an open burning season and required landowners to give their neighbors notice of intent to burn. However, in spite of the laws, little enforcement took place (Kinney 1917, Goodwin 1969, Widner 1968).

The North Carolina Geological Survey was established by the legislature on March 7, 1891, with a law that called for a study of the forests of the State. State Geologist Joseph A. Holmes employed W.W. Ashe as assistant in charge of timber investigations. Ashe was not a forester but became a widely recognized forestry expert and headed the forestry division of the survey when it was created in 1908 (Goodwin 1969). Both of these men were very influential in southern forestry. Notable among Ashe's early work was his

1895 Bulletin No. 7, "Forest Fires: Their Destructive Work, Causes and Prevention." He detailed fire damage to trees and soil and quantified the losses caused by wildfire. This classic work informed readers about how fire and grazing damage forests and reduce their growth potential. He also noted that the annual harvest in North Carolina was substantially greater than his estimate of growth (Ashe 1895).

Gifford Pinchot recognized the importance of the privately owned forest lands, especially in the East, where there were no public lands. As Director of the Division of Forestry in the Department of Agriculture, he issued Circular 21 on October 15, 1898. This was an offer by the division to help farmers, lumbermen, and other private timberland owners to practice forestry on their holdings. The offer included plans with directions for both practical work and assistance on the ground. The service would be provided gratis for woodlot owners, but the larger owners would have

to pay travel expenses for the forester and the costs of local assistants. This was the first of many efforts by the Federal Government to cooperate with private landowners to encourage the practice of forestry (Pinchot 1898).

By June 30, 1899, 123 landowners and farmers from 35 States, owning 1.5 million acres, had asked for help. They included owners of 75 woodlots and 48 large tracts – a response far greater than anticipated and beyond the capacity of the limited staff to serve (Pinchot 1947). By 1905, the assistance program had been extended to ownerships on 11 million acres. Pinchot had also issued Circular 22 in 1899, which offered help to forest landowners for tree planting, an effort focused on reforestation of cutover lands (Steen 1976).

In the Deep South, Henry Hardtner was one of the earliest people to recognize and acknowledge the destructive logging and burning of Louisiana's forests. He is credited with initiating what became Act

113 of the 1904 State legislature, which authorized the establishment of a State Department of Forestry and provided for its administration, the preservation of forests, prevention and suppression of forest fires, reforestation, forestry education in public schools, and penalties for violations. It was a law with great foresight that came to naught because, after passing it, the legislature chose not to fund it.

Hardtner began fire protection on his own lands in 1905 and stepped up his efforts to gain recognition of the problem of cutover land. His influence was important for many years in southern forestry (Burns 1968, 1978).

Natural Resources Conferences

Late in 1907, President Theodore Roosevelt called the first White House Conference on Natural Resources, usually referred to as the "Governors' Conference." It took place May 13–15, 1908, and convened with the State Governors, each with three

citizen advisors; the Cabinet; representatives of the press and associations; and other special and general guests. Pinchot chaired the steering committee. The agenda dealt with mineral, land, and water resources and conservation as a national policy. For the first time in our history, a conference looked at all of the natural resources together and included participants with a full range of interests. Conservation became politically accredited, recognized as policy, and a popular crusade. A conference resolution, drafted by Governor Blanchard of Louisiana, recommended that each State appoint a commission on the conservation of natural resources. Pinchot has said that 40 States eventually did take some action as a result of the conference (Pinchot 1947, Clepper 1968).

On June 8, 1908, President Roosevelt appointed a National Commission on the Conservation of Natural Resources. It had four sections: water, forests, lands, and minerals. It was

chaired by Gifford Pinchot, and its 48 members included a member of Congress chairing each section. The commission immediately undertook a resources inventory in response to its charge "to inquire into and advise on the condition of the country's natural resources." In an all-out effort, the task was completed and summaries of the four sections were presented to the full Commission on December 1 (Pinchot 1947).

A Joint Conservation Conference, called for December 8–10, 1908, attracted nearly 500 people, including 22 Governors, 11 personal representatives of Governors, and 98 representatives of 31 State commissions. In the words of Henry Clepper, "It was, and remains in our history, the single greatest stimulus to resource preservation and management. And this stimulus, be it noted, affected not only Federal and State governments; private interests also took action." Important outcomes included increased State action in fire detection and control, actions that led to

the passage of the Weeks Law, a stimulus to forestry education, and greater attention of major industry owners to protection and management of their holdings. The Governors' Conference, followed by the Joint Conservation Conference, awakened many State governments to the condition of their natural resources and stimulated them to take action. Sometimes they faced great inertia from their legislatures, but nevertheless, many States made progress toward protection and management of their forest resources (Pinchot 1947, Clepper 1968).

Returning from the Governors' Conference, Governor Blanchard encouraged the Louisiana Legislature to establish a State commission, which it did with Act 144, July 2, 1908. Members of the temporary Commission for the Conservation of Natural Resources were instructed to report to the 1910 legislature, and they presented their report with six recommendations. The legislature was responsive.

Act 172 of 1910 created a permanent Conservation Commission. Act 196 created a conservation fund, derived from a timber severance tax, to be used partly for fire protection. Act 261 of 1910 strengthened the act of 1904 and included a timber conservation contract provision. It took 2 years for the referendum and court challenge of the severance tax to be settled, but the tax was held valid. Henry Hardtner signed the first conservation contract on June 14, 1913, for 25,719 acres of Urania Lumber Company lands. Under the contract, his company would receive reduced advalorem taxes on the land if it protected the land from fire and assured the growth of timber. A severance tax would be paid at harvest. Thus the direct impact of the White House conference was felt in the passage of State laws in Louisiana and the initiation of positive forestry measures by the State (Burns 1968).

Southern Forestry Congresses

One of the many efforts to try to strengthen forestry programs in the South was a series of Southern Forestry Congresses. The first of these was held in Asheville, NC, July 11–15, 1916, sponsored by the North Carolina Forestry Association, the Association of Eastern Foresters, the American Forestry Association, the Society of American Foresters, the North Carolina Pine Association, and the Appalachian Park Association. The congress was well attended, and the agenda covered a wide range of subjects. A number of resolutions were adopted covering such items as the need to control and eradicate white pine blister rust, State and Federal appropriations, forest protective associations, and the recent Louisiana law providing for a severance tax. The congress urged the States of South Carolina, Georgia, Florida, Mississippi, and Arkansas to pass laws establishing and funding their own State forestry

organizations. The State Federation of Women's Clubs was recognized for its conservation efforts (Southern Forestry Congress 1916).

World War I distracted the interests of forestry and conservation groups, and it was not until 1920 that the second Southern Forestry Congress took place, in New Orleans. Again the congress was well attended, and the scope of the agenda broadened. Resolutions were adopted on a wide range of items. The Mississippi Legislature was in session, and one resolution requested them to establish a State forestry department. Other resolutions included recommendations for State legislation to prevent forest denudation; seed trees for restocking; separation of land and timber values for purposes of taxation; applying severance tax to timber; continuation of purchases under the Weeks law; and establishment of Federal forest experiment stations (Southern Forestry Congress 1920).

The third Southern Forestry Congress was held in Atlanta in July 1921. This and subsequent congresses—there were 12—passed similar resolutions addressing issues of the day and intended to be used by forestry interests in the promotion of their efforts at State and Federal levels. In Atlanta the scope broadened further to include a resolution in support of a southern school of forestry to educate the needed foresters, a request for a Federal appropriation for demonstration work in farm forestry, and a call for public regulation to keep timberland productive (that is to forbid destructive logging and subsequent fires) (Southern Forestry Congress 1921).

The 12th Southern Forestry Congress was held in Nashville, TN, in 1930. Officers were elected, and Hot Springs, AR, was picked for the 13th congress in 1931. It was never held, apparently a victim of the Depression, and no subsequent congresses were held. Meetings have been held in recent years

with the title "Southern Forestry Congress," but these bear no relation to the original series.

The Southern Forestry Congresses were an effective means of bringing together forestry interests and developing agreement on the approaches to be used in attempting to build forestry programs in the South. State forestry associations were very involved, and their primary efforts at home were in support of legislation to establish and/or fund the State forestry organization. In States with forestry organizations during the twenties, State Foresters were active leaders and participants. The USDA Forest Service offices of State and private cooperation provided much assistance in planning and conducting the meetings. Many of the background papers were based on Forest Service data, and

agency leaders were frequently on the program. J. Girvin Peters, who headed the Forest Service cooperative efforts with the States, was a popular speaker. He was extremely influential throughout this developmental period of State forestry in the South.

The importance of the Southern Forestry Congresses was emphasized by the late E.L. Demmon in his recollections: "I would say that the Southern Forestry Congress, of which R.D. Forbes was a long-time Secretary, probably had more to do with setting up State forestry organizations in the South than any other group." This was one of the congress's priorities, and the organizers skillfully selected locations and arranged the agendas in order to support the efforts to get and to strengthen State forestry organizations (Maunder 1977).

The Weeks Law

During a conversation in 1892 or 1893, State Geologist Joseph A. Holmes of North Carolina suggested to Gifford Pinchot, then employed on the Biltmore property near Asheville, that the Federal Government should purchase a big tract of forest land in the southern Appalachians on which to practice forestry (Pinchot 1947). Holmes was concerned about watershed protection as well as timber production.

There was considerable interest in this idea, and on November 22, 1899, the Appalachian National Park Association was formed in Asheville to work for a national forest preserve in the southern Appalachians. Early in 1901, the association urged the Legislatures of the Carolinas, Tennessee, Georgia, Alabama, and Virginia to enact laws permitting the Federal purchase of lands in their States and providing for tax exemption. North Carolina responded with such a law in 1901. The association's efforts triggered similar activity in New England (Widner 1968).

There was considerable interest throughout the East

in establishing forest reserves and in protecting the flow of rivers. The 1908 conferences further stimulated the public and the States to support the idea.

On March 1, 1911, the Weeks law was passed (36 Stat. 961). While it is generally thought of in terms of its authority to acquire land for national forests to protect the headwaters of navigable streams, it was also important legislation authorizing cooperation between Federal and State Governments.

Section 1 of the act gave consent for the States ". . . to enter into any agreement or compact, not in conflict with any law of the United States, with any other State or States for the purpose of conserving the forests and the water supply of the States entering into such agreement or compact." Section 2 authorized the Secretary of Agriculture to enter into agreements with States to cooperate in the organization and maintenance of a system of fire protection on any private or State forest lands situated on the watershed of a navigable river. However, the law had three stipulations that were controlling: (1) the

protection must be confined to the forested watersheds of navigable rivers; (2) the State must have provided by law for a system of forest-fire protection; (3) the Federal funds expended in any State during a fiscal year must not exceed the amount appropriated by the State for the same purpose during the same fiscal year. It is notable that these were the first two sections of the act and set precedents for future Federal—State cooperation and cost-sharing.

Other sections of the act established the National Forest Reservation Commission and provided the authority and procedures for identifying, examining, and acquiring land for national forests. Large acreages of the eastern national forests were acquired under this authority. Though later expanded, the original authority for purchase was restricted to the purpose of protecting the headwaters of navigable streams. There was also considerable interest in having the Federal Government turn the lands over to the States, but this was not provided in the law. However, the act did require approval of the States before land could be purchased.

The Federal—State cooperation provided in the

Weeks Law was a major turning point for many States. With Federal funds available—\$200,000 was authorized the first year—conservation interests could work toward a State forestry organization with some assurance of Federal help to match State funds for fire protection (Zimmerman 1976).

Among the first steps in bringing the cooperative efforts to full and fair application was a conference in January 1913 for the purpose of discussing the fire-control program under the Weeks law. An Office of State Cooperative Fire Protection had been set up by the Forest Service in 1911 and was able to report progress and other information, which demonstrated that the results were beyond expectation. The administration of the law and various methods of fire control were among items for discussion. There was a strong feeling that the Weeks law cooperation on fire control had been successful and that Congress should be requested to make the appropriation permanent. In July 1914, the Forest Service established a separate Office of Cooperation with Private Timberland Owners, but merged it with the Office of State Cooperative Fire

Protection in 1920 (Peirce and Stahl 1964, Zimmerman 1976).

Other conferences on the administration of the Weeks law were held in 1920 and 1922, dealing with the development of a system of allocating funds based on the cost of an adequate system of fire protection in each State. At the 1922 conference, another important precedent was set. A proposal that would take into consideration in the allocation of funds the relative financial ability of the State to meet its fire-control obligations was voted down. This eliminated the politically and economically infeasible task of determining how much a State could spend on fire control (Zimmerman 1976).

When the Weeks law was signed on March 1, 1911, no Southern State had a full-fledged forestry organization, and none had a system of forest-fire protection. Twenty-five other States had forestry organizations of some kind, and 16 had forest-fire protection organizations headed by a State Forester or chief warden. Eleven of them entered the program immediately, and seven others signed up before the first Southern States, North

Carolina and Virginia, entered the program in 1915. Other Southern States entering the Weeks law program before it was amended by the Clarke-McNary Act of 1924 were Texas (1916), Louisiana (1918), Tennessee (1922), and Alabama (1924) (Peirce and Stahl 1964, Robbins 1985, Widner 1968).

The restrictions of protection to watersheds of navigable rivers severely limited the areas that could be covered in many States, but the States had very small budgets, and protection was planned for selected areas only. The availability of matching Federal funds for fire protection encouraged local interests to campaign harder for State legislatures to enact fire laws and appropriate funds for fire protection.

Initially the Federal funds were used to hire persons for lookouts and patrolmen. The patrolmen were usually local people of good standing in their communities. They were expected to spend as much time as possible on fire prevention by talking with and educating the local people. They were also expected to fight fires and organize volunteer crews in local communities. Though these persons were Federal employees, they reported to the State officials. State

Foresters or other officials were appointed as collaborators so that they could hire the Federal employees and certify vouchers for payment.

The objective of the use of the Federal funds was to stimulate the States into building permanent fire-control organizations. Initially, State allotments were limited to \$10,000, but as more States entered the program, the amount was reduced to \$8,000. A small emergency fund was held for use by any cooperating State with a justified reason (Peirce and Stahl 1964, Zimmerman 1976).

The task of the Forest Service inspectors was that of both technical reviewer of programs and diplomat to persuade State administrators to make needed changes in their policies, programs, and methods. Inspectors were "spread thin" to cover the many States and the large areas brought under fire protection. They not only visited the administrative offices, they spent time with the lookouts and made rounds with patrolmen. Always, the task of educating the public was of high priority (Peirce and Stahl 1964, Zimmerman 1976).

The funds made available to States under the Weeks law provided a means to begin putting fire-control organizations into place. States were encouraged to obtain cooperation and financial support from counties and private owners, but to qualify as matching funds for Federal purposes, there had to be assurance of continued support. Contributions or agreements without a long-term commitment were not accepted in determining State matching funds. Where private owners were willing to cooperate, it was suggested that a per-acre assessment be made by the county or State to assure continuity. Such assessments were to be transferred directly to the State Forester's account for fire protection (Peirce and Stahl 1964).

The initial Weeks law appropriation was \$200,000, to be available until expended, but in 1912 Congress set a limit of June 30, 1915. The original funds lasted only 3 years; an additional \$75,000 was made available in 1914. The following 6 years (1915–20), \$100,000 was appropriated annually, and for 1921, \$125,000.

In 1920, a survey to determine the cost to protect the

non-Federal forest land showed that fire protection cooperation should be extended to 35 States and an estimated 315 million acres of land nationwide. In November 1920, the Secretary of Agriculture asked for additional supplemental appropriations and requested authority to extend cooperation with the States to any non-Federal forest land. Since it would require new legislation, the House Appropriations Committee could not grant the authority. The committee did, however, agree to consider an increase in appropriations for the following fiscal year. A strong case was presented, and the appropriation was raised to \$400,000 for fiscal year (FY) 1922. It remained at that level through FY 1925, after which the Clarke-McNary Act became the authorizing legislation (Peirce and Stahl 1964).

Because so few Southern States were qualified for the Weeks law cooperative fire-control provision, the amounts received were small. They ranged from a total of \$6,000 in 1916 to a total of \$108,000 in 1925. More detail is contained in table 1.

By 1921, expanding State programs and increased

Federal funds made it desirable for the Federal funds to be available for use in any aspect of the cooperative fire-control effort. Thus, in July 1921, the policy for use of Federal funds was changed, and each cooperating State was given an allotment that could be used for any legitimate fire-protection purpose. Federal employees in the States were terminated and in most cases continued their work as part of the State organization (Peirce and Stahl 1964).

In the early years of the Weeks law, Federal funds were not transferred to the States. They were expended in the States to employ people for fire prevention and detection. Emphasis was given to lookouts in towers and on ground patrol to encourage the States to develop a more permanent detection system. These Federal employees worked under the supervision of the State Forester or other official as part of the State fire organization. The cooperative fire-control authority of the Weeks law was replaced by section 2 of the Clarke-McNary Act in 1924 (Peirce and Stahl 1964).

Table 1 - Federal and State expenditures for protection¹ from wildfire, total acres protected, total acres burned, and acres of timberland burned on non-Federal protected lands² in the South, selected years 1916-83

		Expenditures				Acres			
Year	Current dollars	Total		Federal ³		State ⁴	Total protected	Total burned	Timberland burned ⁶
		1982 dollars ⁵	Current dollars	1982 dollars ⁵	Current dollars				
Thousands									
1916	12	--	6	--	5	--	--	9,892	6,624
1920	27	--	10	--	17	--	--	4,151	2,271
1925	288	--	108	--	180	--	--	23,375	21,325
1930	1,141	14,818	391	5,078	750	9,740	69,923	2,843	2,747
1935	1,008	11,200	444	4,933	564	6,267	73,658	1,584	1,514
1940	2,098	21,629	673	6,938	1,424	14,680	88,351	2,154	2,095
1945	3,986	33,780	1,417	12,008	2,569	21,771	89,031	1,301	1,204
1950	9,388	57,595	2,864	17,571	6,524	40,025	135,113	2,704	2,547
1955	14,661	71,170	3,419	16,597	11,242	54,573	157,296	1,946	1,850
1960	19,285	78,077	3,833	15,518	15,452	62,559	168,225	1,144	1,093
1965	25,339	90,174	4,989	17,754	20,350	72,420	183,709	658	557
1970	40,130	109,049	6,053	16,448	34,077	92,601	185,307	892	724
1975	59,996	99,003	8,663	14,295	51,333	84,708	218,582	613	469
1980	76,837	88,932	6,437	7,450	70,400	81,481	232,251	912	747
1981	90,820	96,310	5,461	5,791	85,359	90,519	232,651	1,784	1,405
1982	94,959	94,959	3,630	3,630	91,329	91,329	233,255	574	464
1983	88,997	87,855	3,638	3,591	85,359	84,264	233,255	334	279

Continued

Table 1 – Federal and State expenditures for protection¹ from wildfire, total acres protected, total acres burned, and acres of timberland burned on non-Federal protected lands² in the South, selected years 1916-83 – Continued

¹ All fire-protection activities: prevention, other presuppression, suppression, fuels reduction or modification, and assistance to rural communities.

² Non-Federal protected lands are forest industry, other private, and State and local government lands under the jurisdiction of State fire protection programs. Some Federal lands protected by these programs may be included.

³ All Federal expenditures for administration, technical assistance, cooperative projects, grants to States, and the value of Federal property given or loaned to States.

⁴ State expenditures as reported to the Forest Service. State expenditures start from the year each State established its cooperative program: 1915-NC, VA; 1916-TX; 1918-LA; 1921-TN; 1924-AL; 1925-GA; 1926-MS; OK; 1927-SC; 1928-FL; 1933-AR.

⁵ Converted to 1982 dollars by dividing the expenditures in current dollars by the implicit price deflators for gross national product for total Federal Government purchases of goods and services through 1971 and for nondense Federal Government purchases of goods and services for 1972-83, as reported by the U.S. Department of Commerce, Bureau of Economic Analysis. There is no implicit price deflator for gross national product for years prior to 1929.

⁶ Timberland data available from 1926 to present; prior to 1926 acres burned are for "forest land" with no distinction made between timberland and other forest land.

⁷ Data not available.

Note: Data may not add to totals because of rounding.

The Beginnings of Effective State Forestry Efforts

North Carolina

North Carolina's forestry program grew from the early efforts in the 1890's by W.W. Ashe as forestry assistant to State Geologist Joseph A. Holmes. An active program of investigation and reporting on the forestry situation in North Carolina was carried on, and Ashe established himself as an expert on southern forestry. Holmes and other North Carolinians played important roles in developing the support for passage of the Weeks law. In 1909 W.W. Ashe joined the USDA Forest Service and was replaced by John S. Holmes, a graduate forester.

Attempts were made to pass a forestry law in 1913, but they failed. However, a law was passed "To Protect Watersheds Owned by Cities and Towns from Damage by Fire." It provided that owners harvesting timber adjacent to the city and town property must burn slash in order to prevent the spread of fire to the watershed lands.

In 1915 an "Act To Protect the Forests of the State From

Fire" was passed. It established the office of State Forester in the State Geological and Economic Survey; J.S. Holmes became State Forester. The law provided for appointing forest wardens in townships and districts, gave them police authority, and set penalties for the violation of fire laws. The act also provided that the forest wardens could summon able-bodied men to fight fire and require the use of horses and other property for fighting the fire.

Another act of the 1915 legislature provided for the acquisition of State experiment or demonstration forests by gift or purchase.

With the establishment of the State forestry organization, North Carolina immediately qualified for cooperative fire-control funds under the Weeks law. Fire-control efforts developed slowly; in 1921 the general assembly authorized counties to cooperate with the State in fire prevention and control (Goodwin 1969, Widner 1968).

Louisiana

Though Louisiana had passed several laws mentioned earlier concerning forestry in the State, including a severance tax, no action had been taken to establish a State forestry organization and appoint a State Forester. Finally, Act 66 of the 1916 legislature was passed, establishing a division of forestry under a department of conservation.

R.D. Forbes was employed in 1917 as the first State Forester. His early efforts were to establish a fire-control system and qualify for cooperative funding under the Weeks law. Emphasis was on fire prevention, recognizing that most fires were caused by people.

Act 145 of 1916 provided a general advisory board of four members and the commissioner of conservation as ex officio member. The first funds from the severance tax became available April 1, 1918, for program support (Forbes 1919, Burns 1968).

Alabama

Concern for the ravages of fire in southern forests was reflected in the establishment of a forest commission in Alabama in 1907. Interest had been stimulated by Charles Mohr, who was employed by the Forest Service to do preliminary surveys and prepare a working plan for some lands in central Alabama. His comments about the damage to young growth caused by fire and observations about the loss of productivity of some burned-over lands being farmed for cotton gained support for his efforts and led to the introduction of this bill in the legislature.

Members of the commission were unpaid and lacked legal authority to enforce any action. They had little money to work with, and their efforts met with little success. There were no funds for a permanent employee (Widner 1968).

In 1922, a statewide conservation congress was called in Montgomery; about 100 people attended and made recommendations for new State laws to protect

the resources. Their primary interest in protecting the forest was from the game habitat point of view; timber and wildlife interests were close allies.

That same year, the Democratic convention meeting in Montgomery passed a resolution calling for "a wise policy of conservation of the natural resources of Alabama. . . ." With this commitment the legislature approved the Forestry Act of 1923. Page S. Bunker was appointed State Forester in 1924, and field work began in January of that year (Widner 1968).

Texas

As interests in protection and conservation of southern forests developed, actions to establish a State forestry organization and the office of State Forester were often the result of a dedicated effort by a few individuals. For example, in Texas, banker W. Goodrich Jones is credited with being "the original Texas conservationist" because of his efforts to bring forestry to the State. He had been concerned for many years

with the problems of forest fires and the devastation of logging without provision for a future timber crop. Jones became obsessed with what was happening to the forests before the turn of the century and began to campaign for the planting of trees. He was successful in getting a resolution adopted by the Texas Legislature and signed by the Governor on February 22, 1889, designating George Washington's birthday as Arbor Day in Texas (Chapman 1981).

Jones attracted enough public attention and acceptance of his ideas that he was a part of the Texas delegation to the 1908 Governors' Conference.

Another member was Richard F. Burges, a lawyer from El Paso, and later a member of the legislature, who was most concerned over water. Their mutual interests in conservation led to a strong working relationship and ultimately to the passage of the Burges Forestry Act of 1915, which established the Texas Forest Service as a part of Texas A. & M. College.

Burges had shepherded the bill through the legislature,

and the president and the dean of agriculture at A. & M. had also been influential in getting it passed. The Forest Service's J. Girvin Peters spent considerable time in Texas in the fall of 1914 and helped draft the bill. Although the original draft provided for an independent State agency, this stipulation was changed before the bill was presented to the floor. Why is not clear; it was suggested that placing the organization under the college administration would favorably influence the legislators.

The legislature provided a small appropriation, and on July 6, 1915, John H. Foster was confirmed as State Forester, professor of forestry, and forester to the Texas Agricultural Experiment Station. (The State Forester had teaching obligations as well as responsibility for establishing and running a State forestry organization.) His first efforts were to develop a fire-protection system to qualify for cooperation under the Weeks law. By February 1916, the cooperative agreement had become effective, and Texas received \$2,500 in matching

funds. On September 1, the first fire-prevention patrols were begun with 6 patrolmen covering 7 million acres.

Jones reorganized and reactivated the Texas Forestry Association in support of the State Forester once the legislation was in place. After several stormy years with the legislature and at the same time seeking cooperation from the forest industry, he found his support solidifying. By the early 1920's, State budgets for forestry began to grow and effective programs develop (Chapman 1981).

Virginia

In Virginia, the passage of the Act of 1914 created the office of State Forester under the State Geological Commission. The action seems to have resulted in large part from a groundswell of interest in conservation, probably stimulated by the development and passage of the Weeks law as well as recognition that timber production was declining in the State. In order to implement the new office immediately, rather than wait

for the 1916 general assembly to provide funds, the bill included provisions for the University of Virginia to fund the effort.

The university made an allotment of \$5,000, and Chapin Jones was employed March 1, 1915. His duties included teaching a course in forestry at the university, which he continued to do until 1928. The State Forester's office is still located on the university campus, although there is no longer an administrative tie.

Jones's first major effort was a fire-prevention campaign using a set of 5 posters, 20,000 of which were distributed the first year. Late in the year another 36,000 posters on 24 subjects were distributed. There were other information and education efforts, including lectures and press releases. Cooperation under the Weeks law was established and \$2,000 made available for patrolmen and watchmen. The State initiated cooperation with several major landowners who shared the costs of the fire-protection program. In 1916 the first nursery was

established, and the first seeds were sown in the spring of 1917. The State organization began a steady growth to meet Virginia's needs (Hobart and others 1982 unpubl.).

Tennessee

In Tennessee, early calls for legislation to protect forests and ensure reforestation were made before the turn of the century. In 1887, Arbor Day was established, and the county school superintendents were directed to carry out plantings around buildings, to beautify grounds – all with appropriate ceremony and the stressing of educational aspects.

The first significant step was the formation of the Tennessee Forestry Association in 1901 at a meeting of interested people held at the University of the South. In 1903, the general assembly passed a resolution calling for an investigation of forest conditions and recommendations for statutes for the protection and improvement of the forest lands. This was followed in 1907 by passage of a general

forestry law. It was broad in coverage, including provisions against trespass on State and private property and against fires caused by railroads, loggers, and the burning of charcoal and other fuels. The law also provided for forest reserves. It defined the duties of the State's Department of Game, Fish, and Forestry in administering the law. But, as was so often the case among the States, the legislature appropriated no money to carry out the act.

The Act of 1909 established as a bureau the State Geological Survey and included in its responsibility the survey of forest resources (State of Tennessee 1910 unpubl.). The USDA Forest Service cooperated with the State in publishing a "Preliminary Study of Forest Conditions" in 1910. This report included program recommendations.

Four years later, in 1914, the Tennessee Geological Survey employed its first forester, R.S. Maddox, who became State Forester when the Bureau of Forestry was created in 1921. In 1922 the bureau, in cooperation with

the Forest Service, established a State fire-control system with financing under the Weeks law. In 1923 the bureau became a division of forestry under the State Department of Agriculture, where it remained until 1937 (Widner 1968).

Georgia

Georgia schools began observing Arbor Day in 1890, and in 1906 with a gift of \$2,000 from George Foster Peabody, the University of Georgia appointed its first professor of forestry. The first degree in forestry was granted in 1912. The conservation movement began to develop rapidly in Georgia after the Capper Report of 1920 (USDA Forest Service 1920) and was stimulated by the Southern Forestry Congresses.

The 1921 forestry act established a State Board of Forestry with purely investigative duties (no funds) and charged it to make recommendations to the legislature in 1922. The board's report included a draft bill to establish a State

Board of Forestry, a State Forester, and other personnel to be supported by a State license tax on forest industries. The bill was not passed by the 1922 general assembly.

The Georgia Forestry Association was reorganized and began the fight that led to the Forestry Administrative Act of 1925. Burley M. Lufburrow, the second graduate of the University of Georgia's School of Forestry, was appointed State Forester in September 1925. His start was not encouraging: he was informed that the State had already spent the earmarked funds and he would have no money until 1926. The members of the board then signed a personal note for \$1,000 to get things started. There was also no State office space, so Lufburrow set up in space donated by the Atlanta Chamber of Commerce.

The Georgia Forestry Association continued to fight for the agency whenever it had to go before the legislature for money or other actions. Its fire program got under way quickly; timber protective organizations

were soon formed in the southern part of the State and were very successful. Owners did all the work, furnished labor, fought fires, etc., and shared the costs 50-50 with the State. By 1933, these organizations were protecting 7 million acres from fire (Lufburrow 1952 unpubl., Piki 1966).

Oklahoma

The year 1925 also marked the establishment of a State Forestry Commission in Oklahoma. House bill 184 established a five-person Oklahoma Forest Commission consisting of the president of the State Board of Agriculture, the president of the Oklahoma Agricultural and Mechanical College, and three other persons appointed by the Governor, one of whom was to be chosen from a list provided by the State Federation of Women's Clubs. The commission was charged with instituting ". . . an educational program for the conservation of the forests, woodlots, and growing trees of the State of Oklahoma. . ." and with other activities relating to forestry.

The commission was provided with a secretary, "who shall be a practical forester and have charge of the work. . ." (chapter 146, Acts of the Tenth Legislature).

George R. Phillips was appointed the first State Forester. He soon had a skeleton fire-protection program in place on about 1,350,000 acres with the help of Clarke-McNary funds. A nursery was established at Oklahoma A. & M. College (Widner 1968). That same year, 1925, a new fire law provided punishment for arson and leaving fires unattended. However, it was not very effective and was replaced by a comprehensive law in 1937 (article 1, chapter 15, Acts of the Sixteenth Legislature). Also in 1937, the State legislature declared it the public policy of the State of Oklahoma to safeguard and conserve the natural resources of the State, both renewable and nonrenewable. The State Board of Education was directed to formulate and adopt courses of study about the various natural resources for students in the fourth through the ninth grades, and to establish courses for

use in the teachers' colleges and normal schools of the State (article 6, chapter 15, Acts of the Sixteenth Legislature).

Mississippi

Mississippian Posey N. Howell was the State's first advocate for forestry. He made it a habit to tack up signs on good trees to encourage people to leave them for seed. Howell gained the Mississippi Federation of Women's Clubs as a strong ally for conservation. Its State chairman of conservation, Mrs. G.H. Reeves, was later appointed to the first forestry commission. With the cooperation of other groups, the federation sent Mrs. Lillian T. Conway of the USDA Forest Service on a statewide lecture tour and crusade in favor of establishing a forestry organization. In response to the public interest thus generated, the 1924 legislature passed a joint resolution requiring the Governor to appoint a committee of six to study the forestry situation and report to the 1926 legislature with a suitable draft for a forestry law.

The bill recommended by the committee was adopted on March 6, 1926, and the commission appointed Roy L. Hogue as State Forester on June 1. The limited funds were devoted initially to education, but by 1928 a number of large landowners had agreed to pay 4 cents per acre on 400,000 acres for fire protection, thus providing necessary matching funds for receipt of the full Clarke-McNary allocation and the opportunity to build a fire-control organization (Mississippi Forestry Commission 1984 unpubl.).

Florida

In Florida, 1923 was an important year: the Florida Forestry Association was formed and began its work to have a State forestry department established. The association was unsuccessful on its first try, but on June 6, 1927, the legislature enacted a law that created the Florida Board of Forestry. Harry Lee Baker was appointed State Forester on February 23, 1928.

Despite the usual problem of finances to start a program, things got under way with the development of a fire-protection system. It was based on the formation of "group units" (similar to timber protective organizations), where owners of large blocks of woodland banded together and shared protection costs with the State. Florida also gave educational efforts high priority, and soon a nursery was in operation to provide seedlings for reforestation (Coulter 1958 unpubl.).

South Carolina

In cooperation with the South Carolina Department of Agriculture, Commerce, and Industries, the USDA Forest Service issued a report in 1910 on forest conditions in South Carolina. This led to the introduction of a bill in the 1912 legislature, but it had no particular support and was not considered.

There was no organized activity for several years. Finally efforts began to move in 1922 to build support for a State forestry organization. An attempt to get a forestry law was made in 1923 with

the Governor's support, but it failed. However, there was a law enacted requiring the State Board of Education to provide instruction in fire prevention in South Carolina's public elementary schools. In spite of an address to the legislature by Forest Service Chief William E. Greeley in 1924, no law was enacted.

The year 1925 was no better, but the effort finally succeeded in 1927. The bill was passed without appropriations to avoid a threatened veto by the Governor. A forestry commission was appointed and functioned with its chairman, Horace L. Tilghman, providing necessary funds from his personal account. The legislature was embarrassed into a \$4,000 appropriation in 1928, and Lewis E. Staley became State Forester June 18, 1928.

Education was of first priority, and by taking over an abandoned nursery at Camp Jackson, South Carolina began providing seedlings for reforestation right away. Staley was successful in getting the cooperation and

support of several large landowners in developing his fire-control plans, including investments by them in equipment, fire lines, and other prevention and suppression activities (Widner 1968).

Arkansas

Arkansas was the last of the Southern States to establish the office of State Forester. Throughout the 1920's, there had been increasing concern about protection from fire and reforestation of cutover lands. In 1924 an honorary forestry commission had been formed, and its secretary, Dr. Alexander C. Miller, lectured on forest conservation in the schools and at many public organization meetings. In October 1928, a group was able to get forestry on the agenda of the annual South Arkansas Chamber of Commerce meeting, along with the usual agricultural and industrial items. As an outgrowth of that meeting, the Arkansas Forest Protection Association was formed with strong industry leadership and the goals of establishing a State forestry

department and eliminating forest fires.

The first attempt in 1929 failed by a wide margin. In the meantime, the College of Agriculture had employed an extension forester and a professor of forestry. A 1930 extension circular, "Forestry and Forest Fires in Arkansas," prepared by E. Murray Bruner of the USDA Forest Service, provided good background information for use in the efforts. The year 1930 was also a bad fire year, which probably helped spur the legislature to action.

The 1931 legislature passed Act 234, which created the State Forestry Commission and set forth its duties, including the employment of a State Forester. With the Depression upon them, Arkansas' legislators appropriated no funds in 1931 or 1933. The State could not accept the offer of Civilian Conservation Corps camps on State and private lands because Arkansas did not have an active forestry organization and fire-protection system. When the legislature would not provide the funds, Gov. J.M. Futrell appealed to the public

for donations and in a few months had nearly \$8,000. On May 23, 1933, Charles A. Gillett, at that time State Extension Forester, was appointed State Forester. He immediately called the first meeting of the commission and got his organization under way (Lang 1965).

National Association of State Foresters

Though many of the State Foresters had met in Atlantic City, NJ, in April 1920 to discuss the allocation of Federal funds under the Weeks law, Forest Service Chief Greeley asked all the State Foresters to come to Atlantic City again that November in an effort to broaden support for a Forest Service proposal to expand the cooperative efforts in fire control and other areas of interest to the States and to industry. Greeley favored higher levels of cooperation and control of programs at the State level rather than any form of Federal control and regulation. Former Chief Pinchot, then State Forester of Pennsylvania, did not agree and argued that

Federal regulation of cutting was needed.

Following this meeting, the State Foresters assembled in Harrisburg, PA, at Pinchot's invitation and formed the Association of State Foresters. (The name was changed to the National Association of State Foresters in 1964.) At this meeting Pinchot and Greeley argued their positions, and the lines were drawn. In the end, the association supported Greeley (Zimmerman 1976).

The association has been effective in providing liaison

and advice to the Forest Service and has worked for improved cooperation with public agencies and private interests to provide better protection and management of the Nation's forest lands (Clepper 1971). Each year it provides an updated 5-year national program for State and private forestry. This useful document outlines the consensus of the Nation's State Foresters on specific policy and program issues that they believe are important to the future of our forests and related resources.

Clarke-McNary Act: Expanded Federal Cooperation and Support

Controversy: Federal Regulation of Private Lands

Ten years after passage of the Weeks law, 7 of the 12 Southern States still did not have forestry organizations or laws that would permit them to benefit from Federal fire-control cooperation. Forestry associations had been formed in several States to work toward legislation to establish a forestry office and organization. At the national level, the American Forestry Association was very active. Discussions were under way concerning Federal regulation of private lands for timber cutting, reforestation, and protection. Forest Service Chief Henry Graves stimulated the discussion with a speech before a New England Forestry Conference in February 1919 in which he said that further devastation of the forests should be stopped, and that practical forest management should be applied to both public and private forest lands.

His suggested Federal-State cooperation to solve the problem generated considerable interest but also controversy.

The profession was in agreement that something needed to be done but could not agree on the best approach. Initially there was opposition from industry because of uncertainty about the extent of public control contemplated in the proposal. Graves continued to give attention to his proposal and presented it on a number of occasions to meetings of foresters, timberland owners, and industry operators (Peirce and Stahl 1964, Graves 1919).

Earlier, B.E. Fernow had commented on the forestry situation: "We may as well recognize now as later that forestry is in the main a business for the state, and only under very special conditions for private enterprise. The long time element makes it so." He suggested that the Government could handle the problem of cutover land and that the Weeks law policy be broadened beyond watershed and streamflow to recognize that, ". . .there are far larger nationwide economic interests in this forest problem which call for national action." He also recognized that

most States could not undertake such a financial burden; hence, Federal assistance was needed (Fernow 1917).

In the spring of 1919, the president of the Society of American Foresters appointed a committee for the "application of forestry." It was chaired by Gifford Pinchot, an active proponent of Federal regulation of the management of private timberlands. Pinchot argued that the industry had not acted and would not act for the public good. The committee report late in 1919 outlined a proposal that included as a major provision direct Federal control over the management of privately owned timberlands. Because of the well-known views of the committee chairman, this report became known as the "Pinchot Report," and the program as the "Pinchot Program" (Society of American Foresters 1919, Peirce and Stahl 1964).

Forest industry responded immediately to the society's committee report. The American Paper and Pulp Association released a

proposal that, among other points, recommended an increased annual Federal appropriation for cooperation with the States in fire control but eliminated any public regulation of private lands. It favored voluntary cooperation with the States regarding cutting practices and provided that the States furnish assistance to private owners of forest lands through planning and technical supervision of silvicultural operations free of charge or at cost (Peirce and Stahl 1964).

The National Lumber Manufacturers Association had also drawn up a proposed forestry program that resembled the American Pulp and Paper Association proposal; it differed from it, however, in recognizing the possibility of regulation and favoring the idea that any regulatory legislation should originate with and be administered by the States rather than the Federal Government.

Industry had formed a political action group, the National Forestry Program Committee, under the leadership of Royal S. Kellogg. Kellogg had

presented a proposal in the journal *American Forests* that called for a program of Federal—State cooperation to deal with the problems of reforestation and fire control. He also called for Federal purchase of cutover lands and a census of timber supplies (Kellogg 1919, Peirce and Stahl 1964).

Interestingly, industry's position during this period called for increases in the national forests, especially through purchase of cutover lands. In the main, industry leaders felt that there was a public responsibility to provide fire protection and assist in the reforestation of cutover lands. There was also considerable concern that the tax systems of the States as well as the Federal Government tended to discourage the practice of forestry (Peirce and Stahl 1964, Zimmerman 1976).

In 1920, Graves was replaced as Chief of the Forest Service by William Greeley, who took up where Graves left off. Greeley had long been a proponent of greater cooperation with the States, and Federal assistance to both State and private

landowners. He emphasized the need for fire protection on all forest lands. Greeley developed good working relations with forest industry, close cooperation which later was fruitful in developing and supporting the Clarke-McNary legislation (Peirce and Stahl 1964).

The debate over a national forest policy became more heated over the next several years, though Pinchot's involvement in the 1922 Governor's race in Pennsylvania diminished his activity and leadership of the proponents of Federal regulation. As previously mentioned, Greeley called a meeting of the State Foresters in 1920 to argue for his proposal and the cooperation of the States (Peirce and Stahl 1964).

The Pinchot Report prompted Senator Arthur Capper, of Kansas, to introduce a Senate resolution calling for the Forest Service to investigate the forest situation. The forthcoming "Capper Report" presented the Forest Service position that the Federal, State, and private sectors should cooperate to improve

the forest situation of the Nation.

The report, issued June 1, 1920, contained six recommendations: (1) increased cooperation with the States in fire protection, (2) continued additions to the national forests, (3) reforestation of Federal lands, (4) study of forest taxation and insurance, (5) a survey of forest resources, and (6) increased appropriations for forestry research. However, on May 19, before the report was issued, Senator Capper introduced a bill that incorporated the recommendations of the Pinchot Committee for Federal regulation of timber harvests (USDA Forest Service 1920).

The Move for Consensus

Later that year a conference of representatives of interested organizations and individuals took place in New York to discuss the forestry legislation situation and to attempt to develop a consensus that would attract support from landowners, industries, forestry associations, and the general

public. Attendees agreed unanimously that there should be legislation to establish a national forest policy. Key points were in agreement with the Capper Report.

At or immediately following this meeting, the National Forestry Program Committee, previously mentioned, was formed. It was a major force under Edward T. Allen, who was the executive of the Western Forestry and Conservation Association and later moved to the executive vice presidency of the National Lumber Manufacturers Association (Peirce and Stahl 1964).

In December 1920, Congressman Bertrand H. Snell (NY) introduced a bill incorporating the program advocated by the Forest Service. It was reintroduced in 1921, and hearings were held. Capper had introduced a new bill in the Senate, but it did not cover the total program considered by Snell. Other bills were introduced in attempts to resolve problems delaying consideration of the earlier bill. John D. Clarke (NY) introduced his initial bill in

February 1923 (Peirce and Stahl 1964).

On January 22, 1923, Senator Charles L. McNary (OR) introduced and received approval of a Senate resolution authorizing a Select Senate Committee on Reforestation. The charges to the committee were broad, including authority to hold hearings throughout the United States, and it was directed to report not later than April 4, 1924. The committee held 24 hearings in 16 States and the District of Columbia. They provided an opportunity for all interested persons to be heard. Chief Forester Greeley was present at most hearings, and E.T. Allen represented the viewpoints of private timberland owners. The final report was published January 10, 1924. Prior to release of the report, Senator McNary had introduced S.1182 in December 1923, which incorporated the recommendations of the committee (Peirce and Stahl 1964).

The House had held hearings on the Clarke bill, and in committee several amendments were made. It

passed the House by a vote of 193 to 32. When the McNary bill came before the Senate, it was suggested that the Senate consider the nearly identical Clarke bill that had been passed by the House. Though there were some differences, which he pointed out, Senator McNary agreed. The Clarke bill passed by a voice vote and was signed by President Coolidge on June 7, 1924. It became known as the Clarke-McNary Act (USDA Forest Service 1983, Peirce and Stahl 1964).

Clarke-McNary – A Milestone

Clarke-McNary was the third major milestone in the progress of American forestry (the act of March 3, 1891, creating the forest reserves, and the Weeks law were the first two). The provisions of the new law opened the way for greater cooperation with private landowners.

The original act (1) authorized the Secretary of Agriculture to cooperate with States in devising and recommending fire protection systems for non-Federal lands; (2)

expanded Federal aid for fire protection to watersheds of all navigable streams whether forested or not; (3) authorized an appropriation of \$2.5 million for forest protection, but directed the Secretary to use part of the funds to make a study of the tax laws applicable to land growing timber crops, and to develop methods of insuring timber; (4) authorized cooperation in procuring seeds and seedlings for reforesting denuded land on farms; (5) authorized cooperation with States in advising farmers on woodlots, shelterbelts, and other plantings; (6) amended the Weeks law to allow, for the production of timber, purchase of lands in the watersheds of navigable streams; (7) authorized the Secretary of Agriculture to accept gifts of land valuable for timber production; (8) authorized the survey and classification of vacant public land that should be incorporated in the national forests, with approval of the President and Congress to make such additions; and (9) authorized the President to create national forests from military or other public reservations where doing so would not conflict with the

purpose of the reservation. National parks, monuments, and Indian reservations were excepted.

Three amendments were added to the act in 1925 and 1926. Section 2 was broadened to include nontimbered watershed from which water is secured for domestic use or irrigation. Section 2 was also amended to authorize payment of funds on the certification of the State Forester or other appropriate State official that the funds were expended in accord with the provisions of the agreement. Sections 3, 4, and 5 were extended to cover territories and other possessions of the United States.

The first year of the Clarke-McNary Act, a substantial increase was allowed in the fire-control appropriation over that provided by the Weeks law. Industry lobbying in the next several years resulted in additional increases. By 1929, the total had increased from \$400,000 in 1924 under the Weeks law to \$1.2 million under Clarke-McNary. While \$75,000 had been appropriated in 1925 for the

distribution of planting stock to farmers, and \$50,000 for farm forestry, these sections of the program received only small increases over the next several years. Fire control was obviously the overriding concern of forest industries and the States (Peirce and Stahl 1964, Zimmerman 1976).

Joseph McCaffrey, pioneer forester with International Paper Company in the South, has said that the Forest Service deserves considerable credit for getting States to take action in fire control. As an industry forester, his first priority was fire protection in order to establish regeneration. With the Forest Service working with the States, industries, and timberland owners, and the new markets that the pulp and paper industry provided for small timber and worked-out turpentine timber, the total effort gave a major boost to southern forestry (McCaffrey 1973).

Table 1 provides detailed expenditures for fire protection in the South. At the outset in 1925, about 37.5 percent of fire-protection funding came from Federal

moneys from section 2 of Clarke-McNary. In the years shortly before World War II, the Federal share ranged between 32 and 44 percent. States have continued to increase their share of the funding. In 1983, following reductions during the Reagan administration, Federal expenditures accounted for less than 5 percent of total fire-protection costs.

Over the years, cooperative fire-protection money has served as a catalyst in helping get fire-control efforts underway in the South and in providing the technical assistance and technology transfer that has made possible substantial advances in fire detection and control. Without the cooperation of the Forest Service and Federal matching funds, it is likely that several of the Southern States would have been much delayed in establishing a State forestry department and extending fire protection to the State and private lands.

In most Southern States, timber protective organizations or similar compacts were made between large landowners

and the State to provide fire protection. The agreements varied: sometimes private owners paid the State a per-acre assessment (usually 2 to 4 cents) for State-provided protection; sometimes the landowner or organization actually carried out the total program of detection and control with reimbursement by the State for a share of the costs. These arrangements made it possible to bring large acreages under protection and often led to broadened coverage by encouraging counties to secure fire protection for all lands (Lang 1965, McCormick 1936, Lufburrow 1952 unpubl., Coulter 1958 unpubl.).

The American Forestry Association sponsored one outstanding effort, the Southern Forestry Educational Project. It was initiated in 1928 with participation of the States of Georgia, Florida, and Mississippi. South Carolina replaced Georgia in 1930-31. The 3-year project had an annual budget of \$50,000 jointly funded by American Forestry Association, the States, and other organizations. Six

trucks were fitted with generators and movie projectors. They carried posters, pamphlets, rulers, and other educational materials. The trucks visited schools, communities, churches, and any group that would listen.

During 33 months on the road, this project put on 7,371 shows and lectures and 259 fair exhibits, telling its story to a combined audience of 2,679,030 people. The trucks, which had traveled 283,594 miles on the project, were turned over to the States when the project closed. Many of the people in the audience saw their first moving picture.

Under the slogan "STOP WOODS FIRES--Growing Children Need Trees," this combined education effort was a major step in teaching the public about fire prevention (American Forestry Association 1930, 1931).

Implementation of section 4 (seeding procurement) of the Clarke-McNary Act moved at a much slower rate because of the limited appropriation.

Initially each participating State received \$2,000 to aid in distributing seedlings to farmers. A number of Southern States were able to start small nurseries and begin distributing seedlings. Southern nurseries had an advantage over nurseries elsewhere in the Nation in that seedlings could be produced in 1 year, with the exception of white pine and a few other species of limited interest. State nurseries slowly increased production until the Civilian Conservation Corps moved in to help with the construction and operation of nurseries and tree planting (Zimmerman 1976).

Section 5 of Clarke-McNary provided for cooperation with the States in advising and assisting farmers in the establishment and management of their woodlots, shelterbelts, and other forest growth. The Smith-Lever Act of 1914, which permitted large-scale Federal-State cooperation in agricultural extension, also provided the means to encourage farm forestry. Several of the Southern States had appointed

extension foresters and had educational and extension programs under way. In some States, such as South Carolina and Arkansas, the Extension Forester predated the State forestry organization and worked for the passage of the State forestry law. But Clarke-McNary was the first Federal boost for the extension forestry programs.

The Forest Service had long had an interest in farm forestry; Wilbur R. Mattoon was appointed as the first Extension Forester by Chief Graves in 1912. When the USDA established the States Relations Service, Mattoon became its forestry extension specialist. Unfortunately, competition developed between the State forestry departments and the Extension Service to implement similar programs. The Secretary of Agriculture issued a memorandum in 1925 dividing the responsibility between the Forest Service and the Extension Service at the national level. But the old jurisdictional squabble continued until recent years in some States (Robbins 1985).

However difficult the administration of the assistance program under Clarke-McNary's section 5, it has demonstrated the need for assistance to small landowners to achieve sound management of forest resources. Though the

question of free public assistance is still being debated, recent studies that will be discussed later clearly show the importance of public assistance in the decisions of landowners to take positive action and make investments in forest management.

The Depression Years

By the late 1920's, many forestry programs in the South were beginning to show progress, and the reduction in forest fires and acres burned proved the effectiveness of State programs. Fire protection was not universal: staffs and budgets were far below the best estimates of need when the Great Depression hit. Throughout the States, reductions in budgets began in 1930 and 1931 as the economic downturn caused State revenues to drop. States such as Louisiana, which depended on severance tax to help finance its forestry program, suddenly discovered that the lumber industry was in dire straits. Production was down and many mills closed, thus curtailing revenue (Burns 1968).

In the South, 1930 and 1931 were both severe drought years and the worst fire years for some time. This unfortunate coincidence with the Depression put another strain on the already overloaded fire-protection organizations. In Virginia, for example, firefighters' hourly wages were reduced from 30 cents to 15. Fire funds

were exhausted early in 1931, and many counties could not meet their obligations. In fact, the State Forest Service was broke. The deficit was covered by a \$40,000 appropriation, but as a matter of principle, the forestry division repaid the entire amount in later years from surplus funds (Hobart and others 1982 unpubl.).

During the Depression, many States reduced salary and wage levels to a fraction of those immediately before 1929, but people stayed with their jobs as no other employment was available. In March 1933, Florida, for example, paid only one-half the salary for its personnel. Florida withdrew fire protection from tax-delinquent land, and dropped other acreages because the owners could not pay the assessment (Coulter 1958 unpubl.). In Georgia, 65,000 farms were abandoned, and the legislature was able to appropriate only \$28,659—not enough to match the available Clarke-McNary fire-protection funds (Pikl 1966).

The Federal contributions for fire control under Clarke-McNary continued to increase through fiscal year 1932 and then declined slightly until 1935, when they again began to increase slowly, reaching \$2 million for the first time in 1939 (Peirce and Stahl 1964). Though the Depression hit Southern States hard, many were able to continue to develop their programs. Texas reported that both State and Federal funds increased every year except 1931 (Chapman 1981). Mississippi passed legislation that permitted counties to request countywide fire protection by the Mississippi Forestry Commission, which would be reimbursed from a 2-cents-per-acre tax on forest and uncultivated land (Mississippi Forestry Commission 1984 unpubl.). In 1932, Georgia built two nurseries to produce seedlings for private landowners (Pikl 1966). And in 1934, Florida expanded its nursery program and moved it to a new nursery at Olustee (Coulter 1958 unpubl.).

Forest Survey

The USDA Forest Service and the States had been concerned for many years about inadequate information on the forest resource. There had been no systematic inventory of forest lands and, more importantly, no inventory of the available timber or reliable information on growth. The Forest Service undertook the first such inventory in the South in the 1930's. The task was assigned to the forest experiment stations. With cooperation from the States and private landowners, the survey began on an individual State basis. This first survey and subsequent ones have provided invaluable data that States use to plan their programs and forest industries use to make decisions on plant locations and expansions.

In the late thirties, in an effort to improve planning for the Nation's resources, a National Resources Planning Board was established with regional offices. In 1940, the regional office in Atlanta published "The Southern Forests: A Report of the Regional Committee on Southern

Forest Resources." This report (which excluded Virginia) provided an overview of the forest situation with much tabular material. It was broad in its discussion, covering such items as marketing, taxes, credit, forest management, communities and mill towns, pulp mill towns, and the influx of people with housing problems. It presented a forest program centered around fire protection, forest management, and reforestation, noting that the enormous backlog of reforestation made it difficult to estimate what would be considered an adequate State planting program.

The report identified the major problems as (1) forest fire protection, (2) forest management education, (3) reforestation, (4) adequacy of public forestry programs, and (5) forest communities. In summary, the report stated that these problems could be dealt with by coordinated action if "someone plans for it." The report called for State and local planning and more effective use of the Civilian Conservation Corps and the Works Progress Administration on private

lands, and identified a general need for research. The report was intended to be used by the States to improve their forestry programs (National Resources Planning Board 1940).

Civilian Conservation Corps

Within a few days after his inauguration, President Franklin D. Roosevelt asked Congress to authorize and fund a program of emergency conservation work. On March 31, 1933, scarcely 4 weeks after inauguration, the bill was signed to create a new agency, Emergency Conservation Work. The heart of the program was the Civilian Conservation Corps. With surprising speed, the Departments of Army, Labor, Agriculture, and the Interior mobilized a plan and a process to put young men to work on conservation projects. The Army provided initial orientation and clothing and built and operated the camps. The Department of Labor was responsible for recruitment. Agencies at Agriculture and Interior were responsible for planning and supervising the work and supplying tools, materials,

and training to do the jobs (Fechner 1934, Merrill undated).

A National Plan for Forestry was released on March 30, 1933. Better known as the Copeland Report, it was a comprehensive document prepared by the Forest Service in response to Senate Resolution 175. The report was the most complete review to date of the Nation's forest situation, including past policies and programs as well as current status and plans for the future. It criticized State and private commitments to forest management. It noted that the inability of States to match Federal funds had diminished the effectiveness of the programs, especially in the South, where they were most needed. The report included a program for State aid in forestry. It called for Federal participation to help the States, suggested needed legislation, and estimated required State expenditures with a 20-year projection (U.S. Department of Agriculture 1933).

When the planning was under way to launch the Civilian Conservation Corps, Forest

Service Chief Robert Y. Stuart had the Copeland Report available and argued successfully that corps efforts should be extended to private lands. The report not only provided the information to back that need but also served as a guide in planning the allocation of camps and men (Salmond 1967).

There were some expressed concerns about the relationship of the Civilian Conservation Corps to Clarke-McNary. There was concern in the West that a fire-protection organization would be weakened if inexperienced Corps labor was used to replace permanent, well-trained firefighters. A reduction, or at least level funding under section 2 of the act, was expected—and the Copeland Report was cited to establish the need for full funding under section 2. The thrust of the argument was that Clarke-McNary funds buy a permanent, trained force at relatively low cost. A high value was placed on experience and continuity (Cowan 1936). Virginia experienced the problems of local fire crews "falling apart" after corpsmen became

available for firefighting (Hobart and others 1982 unpubl.).

The first few camps were established on Federal lands, but it was clear from the beginning that opportunities to build nurseries, fire towers, roads, offices, and so forth, lay within the States.

Secretary of Agriculture Wallace called a conference of State officials on April 6, 1933, to discuss extending the corps program in support of State forestry efforts on both public and private lands and in State parks. USDA Forest Service personnel began immediate work with the States to plan for the use of corps personnel when they became available.

While the manpower was available without cost to the States, they had to supply materials for construction projects. They also were required to provide a budget for future maintenance of constructed facilities – sometimes a limiting factor. The challenge was to find labor-intensive ways to accomplish the goals (Fechner 1934, Salmon 1967).

The allocation of camps was very rapid. On June 4, 1933, the Virginia Forest Service had 8 companies of 1,600 men ready for work.

Fortunately, it took a few days to build their camp, giving the State personnel time to get organized, gather tools, and plan forestry-related work. Other States had similar experiences. Each camp had eight supervisory positions available for "technical or practical forester[s]," but few foresters were available at the start. Many positions were filled by civil engineers and forest wardens. Where possible, "local experienced men" were hired for supervisors. They knew the area and the working conditions, and, importantly, they provided a link with the local community (Hobart and others 1982 unpubl.).

During the Civilian Conservation Corps period, 1933 to 1942, the number and location of camps varied widely within States. The number rose quickly, then leveled off until 1935, when closing a number of camps was proposed to reduce Federal budget outlays in

anticipation of the election. But the corps was so popular nationally and politically that very few camps closed. The program tapered off after 1937 as the economy began to strengthen and closed entirely after World War II broke out (Salmond 1967).

The South did not fare as well as some other regions in the allocation of corps camps—a process based on the State's ability to pick up the permanent costs of maintaining the improvements. In the South, where most of the land was in private hands, the owners were paying only about 10 percent of the estimated fire-protection costs. Georgia had more forestry camps than any other Southern State because of the large acreages of land provided fire protection under the timber protective organizations. Camps were assigned to these organizations to build fire towers, offices, firebreaks, and roads; to install telephone lines for fire communications; and to fight fires. Of course, this level of activity encouraged others to form timber protective organizations to receive

similar assistance. In addition to the camps supervised by the forestry organizations, camps were allocated to work on State parks and soil erosion and help some Federal agencies besides the Forest Service and the National Park Service (Robbins 1985).

Exact data on the accomplishments of the Civilian Conservation Corps in the Southern States is not readily available (discrepancies exist in various reports), but in every State the corps provided the mainstay of fire-control activity during its existence. Fire towers were built (more than a hundred in Mississippi); telephone lines were put in place (3,600 miles in Georgia); millions of trees were planted in every State; fires were fought by the thousands, absorbing hundreds of thousands of man-days; and thousands of miles of firebreaks, truck trails, and access roads were completed. The benefits in each State were great. The corps' program is estimated to have advanced fire protection and forestry in the South from 10 to 30 years (Merrill undated, Peirce

and Stahl 1964, Robbins 1985).

In the early months of the corps program, many State organizations were understaffed to take on the planning and supervisory work. Initially this caused some hardship, but as organizations were adjusted and personnel shifted, cooperation strengthened, and the States reaped enormous benefits. In addition to fire-control construction, among the physical facilities put in place were headquarters buildings, warehouses, and residences. Most States had at least one nursery built and equipped or modernized with new buildings or watering systems. In several States, corps crews were used to map forest areas (6.5 million acres in Texas, for example). Demonstration areas of timber stand improvement practices and reforestation were put in place on a limited scale; the law restricted activity other than fire protection on private lands. The work of the corps is still widely evident in the South today, and the State forestry organizations have built

upon that work (Merrill undated, Chapman 1981).

It should also be noted that in some States, Works Progress Administration funds were available to employ persons in the construction of facilities such as fire towers, buildings, and telephones lines (Works Progress Administration 1942).

Tennessee Valley Authority

The valley of the Tennessee River lies mostly in Tennessee but includes lands in six other States. The river had the potential for extending inland navigation hundreds of miles if water levels could be controlled. Its watershed contained more than 20 million acres of forests, most of which had been cut over and abused, and 13 million acres of cultivated land, 2 million of which had eroded beyond hope of recovery. That was the situation on May 17, 1933, when the Tennessee Valley Authority was created. Its areas of interest included navigation, flood control, and power, with all efforts focused on conserving and developing

the valley's resources. Between 1933 and 1941, seven major dams were built. Reforestation and soil conservation were integral parts of the reservoir development program. Reforestation and proper use of marginal lands were identified as needs in the preamble of the act creating the Authority (Tennessee Valley Authority 1983).

Creating the Tennessee Valley Authority at about the same time as the Civilian Conservation Corps was fortuitous. The Authority began at once the planning and construction of a series of major dams on the Tennessee and its tributaries, but at the same time it had to stabilize watersheds and stop soil erosion and siltation of streams and the filling of reservoirs behind the dams. The Tennessee Valley Authority was authorized 38 corps camps. Though the number of camps fluctuated below this high between 1933 and the end of the program in 1942, the corps planted 129 million trees on Federal, State, and private lands in the valley, built 530,000 permanent and temporary check dams, and

spent 54,000 man-days fighting fires. Two nurseries were built to provide planting stock for the corps and for private landowners (Headrick and Schaffer 1983, Seigworth 1968).

The Tennessee Valley Authority immediately established a forestry staff to begin the task of reforestation and the halting of erosion from the cutover and abused forest lands, and the reforestation of the several million acres of the badly eroding farmland that was producing the major silt load in local rivers and streams. The two seedling nurseries produced 50 million trees each year, and these were planted on both public and private lands. Demonstration projects were established to show farmers how to halt erosion through tree planting. By 1942, 110,000 acres (mostly severely eroded land) had been planted with trees. Between 1943 and 1957, another 240,000 acres of similar land were planted.

Fire control was another program of great importance. In the thirties, about 2 million acres of forest—10 percent of Authority land—were

burned each year. By 1950, the annual percentage of forest land burned had been reduced to 4.7 and by 1960, to 0.5.

Grazing of forest land was gradually controlled and reduced from 30 percent of the forested area in the 1930's to about 12 percent in 1960 and 7 percent in 1978.

Each of these three programs—tree planting, fire control, and control of grazing—helped to reduce soil erosion and loss of fertility and at the same time helped to improve the quality and growth rate of the valley's forests (Tennessee Valley Authority 1983, Seigworth 1968).

The more than 500,000 acres of Government land surrounding the 6,000 miles of shoreline on lakes under the Authority's control have made this area an important recreation destination for millions of people. The management and protection of the forest resource contributes greatly to the quality of the recreation environment. Forests in the valley have increased and now occupy about 21.2

million acres. Of this, about 800,000 acres are in parks. The private nonindustrial landowners hold 15.6 million acres (74 percent), and industry owns about 1.7 million acres (8 percent). Timber growth per acre has more than doubled since 1933, and the volumes of sawtimber and growing stock are up substantially and still increasing. The forests provide a resource base for numerous industries and room for additional industrial development (Tennessee Valley Authority 1983).

The Authority has maintained a forestry and wildlife research staff over the years to help solve resource management problems and improve resource utilization. Research accomplishments have been made across the range of forest management problems from nursery to harvesting. Recent efforts have given emphasis on the use of wood for energy and the development of genetically improved trees for the continued reforestation of valley lands.

Recognizing that the Authority's lands lie in several States, and that each State

has a forestry organization and an Extension staff, the Authority has focused its program on cooperation with the Federal and State agencies that have responsibilities for programs within the valley. The transformation of the forests of the Tennessee River Valley into highly productive stands is evidence of the success of the forestry effort (Seigworth 1968).

Norris-Doxey

Since the issuance of Circular 21 in 1898, the USDA Forest Service had sought broader authority to provide assistance to private landowners in the protection and management of their woodlands. The appointment of William R. Mattoon as Extension Forester in 1912 reaffirmed this. The concept of providing technical assistance to landowners had achieved broad support at the time of the passage of the Clarke-McNary Act and was covered in section 5, which authorized cooperation with the States in advising and assisting farmers in establishing, improving, and renewing woodlots,

shelterbelts, and other valuable forest growth. However, the funds appropriated were only \$50,000 the first year and \$60,000 for the next several years—far below the estimated needs. Several suggestions were made for broadening the authority to cover all private lands, not just farms, and to increase the level of activity (Zimmerman 1976).

The Cooperative Farm Forestry Act of 1937, known as the Norris-Doxey Act, broadened the scope of Clarke-McNary, particularly the section that dealt with nurseries and reforestation. It was concerned with developing the farm woodland as a productive unit of the farm and called for demonstration projects, education, and increased nursery production.

Norris-Doxey created controversy because it assigned forestry education to the Extension Service; the Secretary of Agriculture assigned direct assistance in management, harvesting, and marketing to the Soil Conservation Service as part of its farm planning program.

A USDA committee was set up to coordinate programs and efforts among the agencies.

The State forestry organizations, which had been in the forefront of working with landowners, were not given the lead role they expected. The success of developing good cooperative relationships between the three agencies at the State level varied and depended primarily on the level of activity in the State. Where funds were available and cooperation was good, the State forestry agency employed a project forester with the Federal cost-share not to exceed 50 percent. This forester's principal task was the preparation of woodlot management plans in cooperation with the Soil Conservation Service's farm management planning personnel.

In 1945, the Secretary of Agriculture transferred the direct assistance aspect from the Soil Conservation Service to the State forestry organizations. The disagreement between the Extension Service and the State Foresters continued

until 1948, when a joint policy declaration was issued by the Association of State Foresters and the Association of Land Grant Colleges. All educational activities that did not involve direct service to landowners on the ground would be carried out by the Extension Service. Service provided in management, harvesting, and marketing would be the province of State forestry agencies (Wilcox 1940, Zimmerman 1976, Bruner 1943).

Continued Federal Acquisition

Throughout the Depression years, the Federal Government continued to buy land. Purchases for protection of watersheds and timber production on navigable streams continued under the Weeks law. Though appropriations were not large, the Government bought substantial tracts for national forests because of the low price and the desire of owners to rid themselves of the tax burden.

In the early days of the Civilian Conservation Corps, there was difficulty getting camps

assigned to the States for work on private lands; corps labor was restricted to State and Federal lands. There was a general feeling that State ownership of lands should be increased. It was proposed that Federal funds be used to purchase land for State administration. The States would repay the Federal Government with the income from management of these State forest lands (Smith 1935).

The Bankhead-Jones Farm Tenant Act of July 22, 1937, provided new authority to the Secretary of Agriculture to acquire lands for the purposes of carrying out a program of land conservation and utilization that would correct maladjustments in land use and provide many public benefits.

The Resettlement
Administration acquired large acreages of wornout farmland in the Southern States. The purpose was to assist farmers in relocating to better jobs and removing them from their subsistence-level farming. These lands were generally of low agricultural productivity and often badly eroded with little chance for

rehabilitation while being farmed. These lands were disposed of in several ways. Initially many were set up as land utilization projects and managed by the Soil Conservation Service. These projects were turned over to the USDA Forest Service for management in the 1950's and subsequently proclaimed national forests, for example, the Oconee in Georgia and the Tombigbee in Mississippi. Some Resettlement Administration lands were turned over to the U.S. Fish and Wildlife Service for refuges such as the Piedmont National Wildlife Refuge in Georgia.

In many locations, the State became the recipient of the lands, first through lease and later through gift or purchase. A number of projects became State parks and major elements of State park systems. Many Southern States acquired the lands for State forests. They range in size from a few thousand acres up to the 182,000-acre Blackwater River State Forest in Florida. Many are big, and all are managed for multiple use: demonstration, wildlife, recreation, timber, and water, among others. Other

examples include Pea River State Forest in Alabama (32,250 acres), Poison Springs State Forest in Arkansas (19,500 acres), Waycross State Forest in Georgia (35,789 acres), Bladen Lake State Forest in North Carolina (36,000 acres), Manchester State Forest in South Carolina (28,800 acres), and 64,000 acres of State forests in Tennessee and 40,000 in Virginia.

In addition to the lands transferred to the States for forests and parks, many blocks of Resettlement Administration lands were provided to universities and other State agencies. The overall result is that during the Depression years, the acreage of publicly owned lands in the South increased substantially, and many State forests and State parks were established.

World War II

World War II brought an end to the Civilian Conservation Corps and the work that the corps was doing to help build the State forest-fire protection programs and the nursery and reforestation work that was so important in many areas of the South. In the late thirties, the national economy began pick up and provide jobs for the unemployed who had been corps recruits. By 1940, war was under way in Europe, military spending increased, and the United States was beginning to mobilize. The corps dwindled fast. In early 1942, almost immediately after Pearl Harbor, it was disbanded completely. But the State organizations were required to take on some very difficult fire-control tasks right away.

Along the east coast a high priority was given to reducing smoke from forest fires. Not only did this smoke cover airfields and military bases, but more importantly it also reduced visibility off the coast, which hampered antisubmarine operations. It was also critical to put fires out fast, before they could build a glow in the sky that might silhouette ships coming

into ports such as Norfolk and Charleston.

The Federal Government appropriated special funds amounting to more than \$8.5 million nationwide from 1942 to 1946. The moneys came from several different appropriations over the years, and a substantial amount went to the west coast. Funds appropriated for fiscal years 1942 and 1943 were on a matching basis, but the extra funds for fiscal years 1944 and 1945 were on a nonmatching basis (Robbins 1985, Peirce and Stahl 1964, Hobart and others 1982 unpubl.).

Congress recognized that adding emergency fire-control funds to the Clarke-McNary appropriation would exceed the authorized \$12.5 million for 1943 and 1944. In June 1943, Senator McNary introduced a bill increase the authorization to \$9 million by fiscal year 1948 in four annual progressive steps. The bill became law in May 1944 (Peirce and Stahl 1964 Robbins 1985).

There was considerable concern that enemy agents would set forest fires to

destroy timber and to create smoke in critical defense areas. The USDA Forest Service, in cooperation with State organizations, implemented two schemes designed to help with fire control. One was the nationwide Forest Fire Fighters Service, which utilized the volunteer efforts of farmers, ranchers, social and recreational groups, and high school and college students. This program was funded through the Office of Civil Defense and administered by the State Foresters. State organized, equipped, and trained the crews. They were a valuable supplement to the regular firefighting crews of the State and Federal forestry agencies (Robbins 1985).

The second effort—the War Forest Fire Cooperation Program—focused on strengthening protection on State and private lands of strategic importance. The funds supplemented Clarke-McNary but did not have to be matched by States. Most of the funds went to employ seasonal fire crews, and amounts varied widely among regions. In the South, crews were located near military installations or in strategic areas along the coast. In some cases the money was used to strengthen existing

protection; in others it was used to extend protection to previously unprotection areas. Many Southern States had difficulty hiring crews because the wages were tied to existing Clarke-McNary wage scales (Robbins 1985).

The military considered the Nation's forests to be critical to the conduct of the war. They also viewed setting forest fires as a serious crime. This sentiment is well expressed in the following excerpt (Gill 1942) from a general order issued September 21, 1942, by Major General William Bryden, U.S. Army:

Warning is hereby issued that any person who willfully injures or destroys, or attempts to injure or destroy, war material (including standing timber) or war premises (including forests) by fire or other means, . . . is liable to prosecution under the Federal Sabotage Act . . . and, if convicted under such Act, is subject to fine of up to ten thousand dollars or imprisonment up to thirty years, or both.

States such as Georgia, South Carolina, and Mississippi used the emergency funds to expand fire protection greatly. In general, there was a marked

decrease in incendiary fire and a higher level of cooperation in rural areas. Georgia and Louisiana took legislative action to enforce fire laws and punish arsonists. But in Arkansas, the loss of Civilian Conservation Corps crews and budget cuts reversed the progress that had been made in the thirties. Virginia, on the other hand, was able to extend protection to the entire State by 1945. Several counties were in a special emergency Norfolk Defense Area organization, but at the close of the war all counties came under the State program (Hobart and other 1982 unpubl., Robbins 1985).

Other State efforts of importance during the war included hiring utilization specialists to help improve production of mills and marketing personnel to assist in locating and bringing on the market needed timber for lumber and specialty uses, such as oak for ships' timbers. Norris-Doxey funds released from the termination of the shelterbelt program were used to match State funds for the marketing specialists to inventory and mark timber for small landowners. The purpose of this program was to encourage marketing needed timber, but at the same time it included a commitment

from the owner to sell the timber as marked and to follow other guidelines, a major step in landowner assistance (Robbins 1985).

The Texas Forest Service had 3,800 volunteers under the Forest Fire Fighters Service. At the end of the war, the effort was reorganized and continued as the Volunteer Forest Fire Wardens program. This period also saw the early experimentation with aircraft for fire detection. The first trail in Texas was so successful that a Civil Air Patrol—Texas Forest Service aerial fire-detection group was formed. On January 4, 1944, there were 9 aircraft and 70 pilots available on a volunteer basis. Similar trails were under way in other States. This led to the use of aircraft for both fire and insect detection and hastened the use of two-way radio communications between aerial observers and the fire crews on the ground.

Also during World War II, mechanization of firefighting began on a substantial scale with the use of small tractors with fire plows. These mobile units proved very effective and reduced manpower needs. In spite of the demands placed on the State forestry organizations by the war effort, the State

foresters continued to work toward better fire protection, and many were able to increase their landowner assistance efforts (Chapman 1981).

Nursery production dropped because labor was in short supply at the nurseries and for tree planting. Information and education programs were able to use patriotism and war needs to make the public aware of the contributions of forests to the war effort and the need

to protect and manage our forest lands. The Tree Farm System, established in 1941, was also promoted to encourage better management. Fire towers were made available as needed by the military and Civil Defense for use of plane spotters. Either the regular lookout was paid for the job or volunteers did the work (Gill 1942). The Southern States had an excellent record of contributions to the war effort by the State forestry organizations.

After the War

When World War II came to a close, the Southern States began to rebuild their staffs and programs. Many advances had been made during the war: fire protection was extended to previously unprotected areas, the public was more widely educated against woods burning and carelessness with fire, fire-control equipment was improved, and better communications systems were developed. But there were still millions of acres of unprotected lands and substantial acreages of timberland harvested during the war without any efforts at regeneration. Some farmland was abandoned during the war, but as agriculture mechanized, many more small, steep, eroded fields were abandoned because they did not lend themselves to mechanized operations.

The wartime realization of the value of the forests and their importance to the States' economies stimulated State legislatures to continue to strengthen the protection, management, and reforestation efforts. Funding problems were dealt with in various ways. Alabama established a forest products severance tax in late 1945

with 80 percent of the income devoted to fire protection. In 1946, that added \$222,729 to the State budget, with some increases in Federal matching above that and a State forestry operating budget of about \$600,000. By 1948, the operating budget was up to \$1 million, and the tax was providing over \$400,000 (Thomas 1948). Similarly, in 1948 Virginia added a forest products tax to generate \$100,000 for the 2-year legislative cycle and promised that it would be matched by the legislature (Hobart and others 1982 unpubl.).

States implemented surveys of their forest situation and provided information to industry leaders, politicians, and the public describing recent changes in the State's forests and the programs needed to provide protection, reforestation, and management of the resource for the benefit of the State. Every State in the South responded in the postwar years with increases in funding and support for forestry programs. But while the increases were significant, there was uneven treatment of programs,

and progress was often much slower than anticipated or desired.

The postwar era also saw the movement of major forest industries to the South, continuing the trend that had started in the thirties with the construction of several pulp and paper mills. Development has been continuous to the present. New and modern sawmills have replaced the small, portable operations, southern pine plywood has been perfected and is a major product for the South, new pulp and paper mills have been built and old ones modernized and expanded, and new processes for the manufacture of composite boards have led the most recent developments. The creation of new and more competitive markets has encouraged the practice of forest management. The acquisition of large land holdings by major companies, though some are now divesting, has placed millions of acres of southern forests under relatively good management. Some of the most intensive forestry in the world is now practiced in the South. The presence of that

high level of industrial activity and the increasingly important role the South is playing in the Nation's timber supply picture have enhanced the importance of the State forestry programs.

Aviation In Fire and Pest Control

Another important step in postwar development and expansion is the mechanization of forestry practices. In fire control, aerial detection replaced fire towers, providing better observation and, in particular, on-the-scene observations to help direct ground crews. Aerial observers can often determine that spotted smokes are from fires under control or located where they do not pose a risk to forests. This saves the mobilization of a fire crew to check out the situation.

The use of aircraft in dropping retardant on fires to assist in controlling them has progressed greatly from the first "water bombers," modified military aircraft from World War II. Multiengined aircraft adapted for fire attack are available for large fires.

And as the lift capacity of helicopters has increased, they have been used more widely in the aerial firefighting role. The buckets for helicopter use can be hooked up in a few minutes, making any available helicopter a potential firefighter yet leaving it unrestricted for its principal use, unlike most fixed-wing aircraft.

On the ground, improvements in tractors, plows, and transports have increased the mobility and effectiveness of fire crews. Wetting agents and retardants have made water more effective in quenching fire. Recent progress has been made in the use of heat-sensing instruments to help personnel map fires at night and locate hotspots for special attention.

Undoubtedly some of the most important developments have been in communications. Radio is now the standard communications link in fire-control programs, and repeater stations and base stations provide statewide coverage among all personnel.

Aerial surveillance also has been broadly applied to the detection of insect and disease outbreaks. Periodic flights with and without photography are routinely used to detect and measure the rate of spread of epidemics of insects such as the southern pine beetle and the forest tent caterpillar. In the 1950's, when annosus root rot was being widely detected in thinned old-field plantations, aerial observers quickly detected potential infection centers for subsequent ground checks.

Finally, pesticides for defoliators and certain seed orchard insects are applied principally from the air.

Nurseries and Regeneration

Nursery programs in all Southern States have gone through several stages of development and expansion. In most States the nurseries built by the Civilian Conservation Corps were the mainstay of production immediately after the war. As demands increased, nurseries were expanded or new ones built. The Soil Bank Act of 1956 (P.L. 540)

provided the stimulus and funding for rapid expansion of State nurseries and increases in tree planting in all the Southern States. The conservation reserve feature of the act was designed to retire marginal lands from farming in order to reduce crop production and agricultural crop surpluses. The act provided the authority for the Secretary of Agriculture to contract with farmers to place cropland acres into the reserve for fixed periods of time.

Landowners who agreed to plant trees usually contracted for a 10-year period. Owners received financial assistance for planting and an annual payment for the contract period to assure that the land would be kept in tree cover. That way, owners took in some annual income from the acreage to bridge the time until the plantations were ready for thinning. Nursery production was doubled in several States to meet the program needs.

Soil Bank funds were provided directly to the States in fiscal years 1957 and 1958 to build new nurseries, expand old ones, modernize existing nurseries, and build

facilities for the drying of cones and the extraction and processing of seed. Permanent cold-storage facilities were built for seed storage, and the USDA Forest Service, in cooperation with the Georgia Forestry Commission, expanded its seed testing program and built a new laboratory. That laboratory at the Georgia Forestry Center now provides seed testing service for the entire Nation. Besides providing construction funds, the Soil Bank Program also gave money to the States to assist landowners with technical help in tree planting. The 1,918,564 acres reported as planted under the Soil Bank Program was the largest short-term effort seen in the South.² Those plantations are now contributing large volumes of wood.

The success of the Soil Bank Program is widely recognized and often cited in arguments for incentive programs for reforestation. A similar program is included in the Food Security Act of 1985 (the Farm Bill).

² Data provided by USDA Forest Service.

The Conservation Reserve Program in the 1985 act is specific in its objective to reduce erosion; therefore, lands placed in the Conservation Reserve will be different from those in the Soil Bank. Trees are included in the 1985 bill as a recommended cover for Conservation Reserve-diverted lands.

The Soil Bank Program peaked in 1959-60 (tables 2 and 3) and was phased out in 1964. Subsequently, State nursery production dropped until various State and Federal incentives programs began. Since then, nursery production increased, and it has barely been able to keep up with demand in several States. A number of forest industry companies have also built their own nurseries. Some, such as Weyerhaeuser Company, are supplying seedlings to cooperators who formerly purchased from the States. Prior to building their own nurseries, many companies contracted with the States to produce seedlings for them. In fiscal year 1984, the Nation's top eight State forestry

organizations in nursery production were all in the South. They produced from 49 million to 107 million seedlings shipped (USDA Forest Service 1985).

The Agricultural Conservation Program, authorized under the Soil Conservation and Domestic Allotment Act in 1936, was a broad effort to aid in the control of soil erosion and the rehabilitation of mistreated agricultural lands. Tree planting was only one of many activities the act encouraged in the conservation area. Though the total acreage planted to forest trees was not large, the acres treated were some of the most critically in need of protection. During the period 1979-83, an average of 29,000 acres were planted annually under the program in the South.³

Congress's recognizing the imperative to step up reforestation in the South in the late 1960's and early 1970's led to enactment of the Forestry Incentives

³ Data provided by USDA Forest Service.

Table 2—Regeneration¹ in the South, by ownership, 1925-85

Year ²	Total	Industry ³	Other private	Federal	Other public
<i>Thousand acres</i>					
1925	31	15	14	2	(4)
1926	7	7	(4)	(5)	(5)
1927	3	3	(4)	(5)	(4)
1928	10	9	1	(4)	(4)
1929	13	10	2	(4)	(4)
1930	13	7	5	1	(4)
1931	8	3	4	(4)	1
1932	8	3	4	1	1
1933	3	(4)	2	(5)	(4)
1934	20	1	8	9	2
1935	45	2	3	17	4
1936	114	3	7	58	15
1937	118	5	4	60	9
1938	189	11	01	73	4
1939	171	14	90	63	4
1940	175	8	108	54	4
1941	193	12	107	66	8
1942	66	10	28	26	1
1943	20	6	11	2	(4)
1944	11	2	8	(4)	(4)
1945	56	8	46	1	1
1946	57	9	43	4	1
1947	56	6	44	5	1
1948	186	51	120	12	4
1949	225	100	86	19	20
1950	293	131	118	16	28
1951	253	113	119	14	6
1952	254	132	109	9	5
1953	427	232	158	29	8
1954	517	267	216	23	10
1955	496	238	224	27	7
1956	595	256	294	32	13
1957	811	321	444	38	7
1958	1,095	348	689	46	12
1959	1,664	435	1,162	54	13
1960	1,564	496	1,000	57	11
1961	1,192	547	578	54	14
1962	816	381	341	76	19
1963	793	436	263	72	22
1964	757	435	232	72	18

Continued

Table 2—Regeneration¹ in the South, by ownership, 1925-85—Continued

Year ²	Total	Industry ³	Other private	Federal	Other public
<i>Thousand acres</i>					
1965	710	401	220	73	17
1966	698	394	215	72	17
1967	767	419	263	74	10
1968	793	493	212	78	10
1969	789	536	162	79	13
1970	861	597	173	80	11
1971	1,003	722	167	99	14
1972	992	664	214	01	13
1973	1,025	706	207	97	15
1974	1,036	725	197	95	18
1975	1,255	900	243	93	20
1976	1,175	840	231	86	18
1977	1,304	936	271	80	18
1978	1,314	966	263	71	14
1979	1,341	933	326	75	7
1980	1,508	1,005	392	103	7
1981	1,207	725	388	84	11
1982	1,691	1,181	415	83	11
1983	1,617	1,050	477	81	10
1984	1,840	1,158	590	84	8
1985	2,012	1,200	712	83	17

¹ Includes planting and direct seeding. Excludes site preparation for natural regeneration.

² Fiscal year.

³ Forest industry and mining, railroad, and utility companies.

⁴ Less than 500 acres.

⁵ None reported.

Note: Data reported in the sources listed below vary considerably in quality and accuracy. Therefore, the data shown in this table may be incomplete. Data may not add to total because of rounding.

Sources: 1980-85—U.S. Department of Agriculture, Forest Service. [Annual issues.] 1980 (etc.). U.S. forest planting report. Washington, DC: U.S. Department of Agriculture, Forest Service. 1925-79—U.S. Department of Agriculture, Forest Service. 1980. A statistical history of tree planting in the South 1925-1979. Misc. Rep. SA-MR-8. Atlanta, GA: U.S. Department of Agriculture, Forest Service, Southeastern Area, State and Private Forestry. 36 p.

Table 3—Federal expenditures for regeneration and stand improvement¹ and acres treated on other private ownerships in the South, 1936-85

Year ²	Expenditures					Thousands
	Total		Forestry Incentives Program		Agricultural Conservation Program	
	Current dollars	1982 dollars ³	Current dollars	1982 dollars ³	Current dollars	
Year ²						
1936	(⁴)	-	(⁴)	-	(⁴)	-
1937	(⁴)	-	(⁴)	-	(⁴)	-
1938	(⁴)	-	(⁴)	-	(⁴)	-
1939	(⁴)	-	(⁴)	-	(⁴)	-
1940	(⁴)	-	(⁴)	-	(⁴)	-
1941	(⁴)	-	(⁴)	-	(⁴)	-
1942	(⁴)	-	(⁴)	-	(⁴)	-
1943	(⁴)	-	(⁴)	-	(⁴)	-
1944	(⁴)	-	(⁴)	-	(⁴)	-
1945	14	119	(⁴)	-	14	119
1946	54	450	(⁴)	-	54	450
1947	33	223	(⁴)	-	33	223
1948	89	546	(⁴)	-	89	546
1949	238	1,352	(⁴)	-	238	1,352
1950	355	2,178	(⁴)	-	355	2,178
1951	313	1,739	(⁴)	-	313	1,739
1952	324	1,679	(⁴)	-	324	1,679
1953	257	1,311	(⁴)	-	257	1,311
1954	447	2,269	(⁴)	-	447	2,269
1955	625	3,034	(⁴)	-	625	3,034
1956	1,662	7,730	(⁴)	-	1,662	7,730
1957	2,482	11,931	(⁴)	-	2,482	11,931
1958	3,309	13,674	(⁴)	-	3,309	13,674
1959	3,694	15,016	(⁴)	-	3,694	15,016

Continued

Table 3—Federal expenditures for regeneration and stand improvement,¹ and acres treated on other private ownerships in the South, 1936-85—Continued

Year ²	Expenditures					Thousands	
	Total		Forestry Incentives Program		Agricultural Conservation Program		
	Current dollars	1982 dollars ³	Current dollars	1982 dollars ³			
1960	3,380	13,684	(5)	—	3,380	13,684	
1961	3,086	12,344	(5)	—	3,086	12,344	
1962	2,305	8,900	(5)	—	2,305	8,900	
1963	1,752	6,611	(5)	—	1,752	6,611	
1964	1,609	5,915	(5)	—	1,609	5,915	
1965	1,517	5,399	(5)	—	1,517	5,399	
1966	1,459	4,963	(5)	—	1,459	4,963	
1967	1,623	5,321	(5)	—	1,623	5,321	
1968	1,218	3,771	(5)	—	1,218	3,771	
1969	1,110	3,284	(5)	—	1,110	3,284	
1970	1,211	3,291	(5)	—	1,211	3,291	
1971	1,903	4,781	(5)	—	1,903	4,781	
1972	3,262	6,970	(5)	—	3,262	6,970	
1973	1,106	2,262	(5)	—	1,106	2,262	
1974	7,009	13,150	6,109	11,461	901	1,690	

Continued

Table 3—Federal expenditures for regeneration and stand improvement¹ and acres treated on other private ownerships in the South, 1936-85—Continued

Year ²	Expenditures						Stand improvement	
	Total		Forestry Incentives Program		Agricultural Conservation Program			
	Current dollars	1982 dollars ³	Current dollars	1982 dollars ³	Current dollars	1982 dollars ³		
<i>Thousands</i>								
1975	804	1,327	(9)		804	1,327	148	
1976	5,347	8,316	5,158	8,022	189	294	89	
1977	7,850	11,360	7,255	10,499	596	863	152	
1978	9,513	13,140	8,974	12,395	539	744	167	
1979	11,514	14,762	10,829	13,883	686	879	209	
1980	13,749	15,913	12,442	14,400	1,307	1,513	226	
1981	15,056	15,966	13,562	14,382	1,494	1,584	217	
1982	10,834	10,834	9,226	9,226	1,608	1,608	172	
1983	9,662	9,538	7,662	7,564	2,000	1,974	173	
1984	7,504	7,140	6,016	5,724	1,488	1,416	155	
1985 ^o	10,128	9,387	7,536	6,985	2,592	2,402	217	

Continued

Table 3—Federal expenditures for regeneration and stand improvement¹ and acres treated on other private ownerships in the South, 1936-85—Continued

¹ Regeneration includes planting and direct seeding for all years and site preparation for natural regeneration from fiscal year 1982 forward; stand improvement includes intermediate stand treatments to increase timber growth or enhance timber quality. Federal cost-shares cover up to a maximum of 75 percent of the treatment costs under ACP or 65 percent under FIP. Federal cost-shares may be set below the maximum level at the option of individual State programs.

² Fiscal year.

³ Converted to 1982 dollars by dividing the expenditures in current dollars by the implicit price deflators for gross national product for all Federal Government purchases of goods and services for 1945-71 and for nondesignate Federal Government purchases of goods and services for 1972-85, as reported by the U.S. Department of Commerce, Bureau of Economic Analysis.

⁴ Data not available.

⁵ No program in that year.

⁶ None reported.

⁷ Less than 500 acres.

⁸ Includes tree planting under the Soil Bank Program.

⁹ FIP activities in 1975 included with 1976 FIP activities.

¹⁰ Preliminary figures.

Note: Data may not add to totals because of rounding.

Program as part of the Agriculture and Consumer Protection Act of 1973. The success of the Soil Bank Program demonstrated that financial incentives in the form of cost-sharing and annual payments are an effective way to get trees planted. The Agricultural Conservation Program is a further demonstration, but of limited application for comparison. The forest incentives proposal introduced to Congress in Senate bill S 3105 in 1973 received support from the Association of Consulting Foresters, the National Forest Products Association, the American Pulpwood Association, the American Forestry Association, the Forest Farmers Association, and many others groups. The Nixon administration was in agreement with its objective but opposed the bill because it was inconsistent with the revenue-sharing approach to the allocation of Federal moneys to States. The program passed easily and was initially funded at \$15 million—a level that has remained relatively constant in terms of dollars

appropriated but unadjusted for inflation.

The Forestry Incentives Program has given a major boost to tree planting in the South. The average annual number of acres planted in the South under the program from 1980 to 1984 has been 158,530.⁴ It is administered cooperatively by the State Foresters, the Forest Service, and the USDA Agricultural Stabilization and Conservation Service and provides direct cost-sharing for reforestation and timber stand improvement. The total amounts available to each State are determined by a formula, but the percentage of costs paid and the upper limits on the dollar amounts are determined by each State to fit its needs.

The development of pine seed orchards to produce genetically improved seed for artificial regeneration of stands is another important advance. In the mid-1950's, Georgia and Texas initiated programs for the selection of

⁴ Data provided by USDA Forest Service.

phenotypically "plus" trees. These were grafted onto seedling rootstocks and planted in orchards, where they were given special care. Progeny tests of each parent were established to determine their values as parents (Dorman and Kraus 1967, Chapman 1981). Those least desirable have been removed from the orchards.

All Southern States have seed orchards and are continuing to seek greater improvement through tree breeding and exchanges of material among cooperators southwide. As progeny test results become available, new second-generation orchards are being established. In addition to general growth characteristics such as rate of growth, size and numbers of limbs, and stem straightness, tree breeders consider resistance to disease an important trait. Even a modest increase in resistance to fusiform rust can mean a substantial increase in per-acre stand growth in areas with high rust hazard.

Orchards were begun at least 20 years ago by 9 of

the 12 States. Acreage established by June 1981, the last available compilation, showed the Southern States with 3,375 acres, 78 percent of all State-owned seed orchards, and 27 percent of all orchards in the Nation. While the proportion varies from year to year depending on seed crop, several States now produce the majority of their loblolly and slash pine planting stock from orchard seed. Southern State seed orchards also include shortleaf, sand, Virginia, and white pines, and small acreages of several Christmas tree species and hardwoods (USDA Forest Service 1982).

Landowner Assistance

Technical assistance to individual landowners has been provided by public forestry agencies since Pinchot's Circular 21. It was expanded with section 5 of the Clarke-McNary Act and later the Norris-Doxey Farm Forestry Act of 1937. Though there was controversy in the administration of Norris-Doxey, the limited funds provided made it possible for cooperating

States to employ a few farm foresters. During World War II, those funds were used to employ marketing specialists to increase the production of timber. Immediately after the war, there was a strong interest on the part of the Forest Service and the Association of State Foresters in moving ahead with a landowner assistance program. At the close of the war, the Secretary of Agriculture transferred the Soil Conservation Service's Norris-Doxey functions to the Forest Service, and the Forest Service then changed the assistance program to a reimbursable, State-directed operation in 1947. This switch from Federal to State employees prevailed despite resistance by some Forest Service offices (Zimmerman 1976).

In response to a departmental long-range planning request in 1947, the Forest Service had listed as a high priority technical assistance to small landowners and the elimination of restrictions on who could receive help. Nonindustrial owners held millions of acres of land in nonfarm holdings. The controversy over jurisdiction

of the Norris-Doxey Farm Forestry Program had kept a unified effort on the issue stalled. Resolving the controversy in 1948 cleared the way for the Association of State Foresters to begin efforts for legislation to address the problems of management of all nonindustrial private forest lands.

In December 1948, the executive committee of the Association of State Foresters voted to join with the State extension services in promoting forestry legislation that would increase the authorizations for Clarke-McNary sections 2 and 4, broaden section 4 to include nonfarm lands, clarify section 5 to make it clear that education is intended, and make provision for forest management service work. When the proposed legislation was introduced in the House, and a companion bill in the Senate, opposition came only from the National Lumber Manufacturers Association, the Consulting Foresters Association, and the Commercial Nurserymen's Association. These amendments to the Clarke-McNary Act became

law on October 26, 1949 (Zimmerman 1976).

The following year the Association of State Foresters, still concerned about the apparent restrictions of technical assistance to farm ownerships, decided to seek new legislation. After meetings with forest industry representatives, consulting foresters, the Forest Service, and others, the association provided a draft bill, and Congressman Sikes introduced it. A subsequent meeting was held with representatives of the Forest Service, Southern Pine Association, National Lumber Manufacturers Association, and Consulting Foresters Association to resolve disagreement on language in the bill. The problems were resolved, hearings were held, and the Cooperative Forest Management Act became law on August 25, 1950.

The act authorized \$2.5 million of matching Federal funds, and States were quick to respond with necessary legislation and funds to qualify for the Federal assistance. This act was the

critical element in developing a cadre of professional foresters (1) to provide technical assistance and advice to small woodland owners on improving management of their woodlands, and (2) to improve the efficiency of marketing, harvesting, and manufacturing of forest products (Zimmerman 1976).

Though a popular program, the Cooperative Forest Management Act has attracted Federal appropriations far below those identified as needed in the planning processes. States have recognized more clearly the importance of the work and continued to expand their efforts. Guidelines observed by the State Foresters are intended to minimize competition for jobs that would normally be handled by free enterprise. When appropriate, landowners are referred to consultants or other sources for services (USDA Forest Service 1982 unpubl.).

Pest Control

The Forest Pest Control Act was passed by Congress in

1947. It followed the Clarke-McNary pattern in offering Federal technical and financial assistance to States for the detection and control of insect and disease outbreaks. At that time the insect program was administered by the Bureau of Entomology and Plant Quarantine, and the disease program, by the Bureau of Plant Industry, Soils and Agricultural Engineering. These responsibilities were transferred to the Forest Service in 1954.

Although this program covers the full spectrum of insects and diseases that attack forest trees, its most useful work in the South has centered on the southern pine beetle. Under the program, Forest Service specialists are available to work with the States on their pest problems, and cost-share funds are available to assist in detecting and controlling outbreaks.

Resource Conservation and Development Program

One USDA program of local importance in many States is the Resource Conservation

and Development Program. Its purpose was to encourage the State and local units of government and local nonprofit organizations to plan, develop, and carry out programs for resource conservation and development in rural areas. These programs should enhance local social, economic, and environmental conditions.

Federal funds were available to assist the program's local project managers. In the South, all of these projects involved forestry and either employed a full-time forester or, through cooperation with the State Forester, had a member of the State forestry organization assigned to work with the project. The scope of the work varied from reforestation and forest management to assistance in the establishment of small woodworking plants.

Rural Community Fire Protection Act

The Rural Community Fire Protection Act of 1972 (P.L. 92-419) responded to the needs of small towns and rural communities for

assistance in organizing, training, and equipping rural fire companies. Many such communities had organized efforts for fire protection, but without adequate funding their firefighters were poorly trained and not equipped to do the job. This program responsibility, with limited funding, was given to the State Foresters for implementation.

Initially the program emphasized organizing and training firefighters. As funds became available, the program bought radios and specialized equipment. A major contribution has been the *loan* of Federal excess personal property to the States, through State Foresters to the rural community fire companies. Rebuilding and modifying excess Federal vehicles and equipment have greatly increased the fire-suppression capability of these small rural fire departments. In addition to providing better protection and capability for fighting structural fires, these fire companies have been integrated in many areas into the early response to forest and brush fires. The

capability of these companies to respond has meant better deployment of State and county forest-fire control units.

Interstate Fire Compacts

Severe fire years have emphasized the need for cooperation among the States. Two multi-State compacts were organized in the South: the Southeastern Interstate Forest Fire Protection Compact, authorized in 1956 by Congress, and the South Central Interstate Forest Fire Protection Compact. These compacts provide the mechanism for exchange of personnel and equipment for fire protection. Joint training and periodic meetings among fire specialists in the States assure close cooperation and the ability of crews from one State to operate efficiently when called upon to fight fires in another State. The fire season of 1985 most recently called the compact into use in the Southeast.

In addition to the regional compacts, agreements with the Forest Service and State compacts in other regions

have made it possible to move emergency firefighting crews throughout the country when needed. Southern firefighting teams were used on fires in the Western States in 1985.

In the South, the State forestry organizations are the leaders and principal coordinators for all fire protection on State and private lands. In each State, cooperative agreements are in place for protection of, or cooperation in the protection of, Federal lands.

Other USDA Programs

During the postwar years, State Foresters were asked to cooperate on a number of other Federal programs with several agencies. Besides those programs previously mentioned, State forestry organizations were involved in planning and conducting forestry activities under the Watershed Protection and Flood Prevention Act of 1954, P.L. 566.

Initiation of State Incentives Programs

During the rapid expansion of the forest industries after World War II, the Forest Service has carefully surveyed both timber growth and harvest. In hardwoods, the size and quality of individual trees have trended downward. Total volume growth, however, has trended upward. There is currently a substantial excess of hardwood growth over harvest southwide. However, in the Mississippi River Delta region, the clearing of hardwood bottomlands for agriculture has removed thousands of acres of forest land from production in Mississippi, Louisiana, and Arkansas.

The situation in pine is quite different. While growth in the South has continued to exceed harvest, the trendlines for both are converging. In some areas, harvest is exceeding growth. For example, the 1966 forest survey reports for Virginia indicate that this was happening in the southeastern part of the State. The survey report forcefully stated that the

problem was serious and that action must be taken to regenerate pine stands to ensure a future timber supply.

Virginia's Regeneration Program

Even before the survey data were available, the Virginia Division of Forestry was aware of the lack of pine regeneration and had begun to discuss with industry leaders and other forestry interests ways to solve the problem over the long term. The idea that seemed most feasible was some form of financial incentive and assistance to the landowner, with costs to be supported by a severance tax on harvested timber (Rodger 1973).

Forest industry supported the idea, and the State's leaders were willing to provide political support as well as the financial support through the severance tax. Key members of the general assembly were provided special briefings on the proposal at an early stage. The governor agreed to support the proposal if at least 50 percent of the cost

could be covered by the new tax. He asked the State to match the fund. With this general support of the proposal, the Virginia Forestry Association cooperated in holding a series of public meetings to obtain comments and to get the reactions of key people (Custard pers. communication).

The rationale for the proposed program was threefold. First, the evidence showed a great need for increased investments in reforestation. Second, industry recognized it could tax itself, and through the incentive get landowners to invest in reforestation and stand improvement practices that would result in a more stable timber supply for the future. Third, this would be a three-way effort with funding by the landowner, the severance tax receipts, and the State's general fund. When presented to Virginia's general assembly in 1971, the Reforestation of Timberlands Act passed the Senate unanimously and the House of Delegates with only a single dissenting vote. Every 2 years, the general assembly appropriates funds based on the estimated

severance tax receipts for the coming years. In 1981, the tax on pine timber was doubled in order to provide more funds to meet Virginia's needs (Custard pers. communication).

Virginia's reforestation tax program predates the Federal Forestry Incentives Program, though there had been a continuing cost-share program under the Agricultural Conservation Program. When the Forestry Incentives Program became available, some of the acreage being regenerated under Virginia's program shifted to the Federal program, especially during the late 1970's, when the Federal cost-share was set at 75 percent while the State held its cost-share at the original 50 percent. The cost-shares have shifted between the programs over the years and are currently 50 percent for the State's program with a \$60 per-acre maximum, and 60 percent for the Forestry Incentives Program with an \$80 per-acre limit.

Virginia officials believe that 50-percent cost-sharing is the most effective use of

reforestation tax funds; levels above that stimulate little additional investment by landowners.

With the recent increase in State funds, the total acreage covered for reforestation and release work by Virginia's program and the Federal Forestry Incentives and Agricultural Conservation Programs was 58,375 in 1984 and 62,942 in 1985. In each year, Virginia's program has been used on more than twice as many acres as both Federal programs combined. All three programs are being used to the limit of available funds, and backlogs of waiting landowners have been practically eliminated (Stanley pers. communication, Graff pers. communication, Rodger 1973).

It should be noted that Virginia's program applies to areas not reforestable under the Virginia Seed Tree Law. Therefore, the program is used to convert hardwood stands to pine along with planting open lands. In delivering services to landowners, there have been difficulties. To keep programs on schedule and provide

services when needed, the Department of Forestry owns and operates site-preparation equipment to handle work when contractors or forest industry services are not readily available. Similarly, the State provides assistance in prescribed burning, organizes planting crews, and contracts for the aerial application of herbicides. In the case of herbicide applications, the State identifies and schedules as many tracts in one area as possible so that when the work begins, it can be done rapidly and efficiently with close attention to quality control and environmental protection. To assure quality control, the State acts as the contractor for landowners. To assure environmental protection, State personnel provide on-the-ground supervision of each treated tract. All of these services are provided to the landowner via a per-acre surcharge to cover costs (Stanley pers. communication, Graff pers. communication).

Other State Incentives Programs

Virginia's highly successful Reforestation of Timberlands Program has been used as a pattern for other Southern States concerned about the pervasive problem of the failure of nonindustrial forest landowners to regenerate their pine stands after harvest. Mississippi, North Carolina, and South Carolina now operate similar programs.

Texas has taken a different approach. The Texas Forestry Association has formed the Texas Reforestation Foundation (TRe Foundation) to provide financial assistance to landowners in return for a commitment to manage their land for trees for at least 10 years. The program is in cooperation with the Texas Forest Service, with funds provided principally from contributions to the TRe Foundation by forest industry.

The most recent program—the Alabama Agricultural and Conservation Development Commission Program—was legislated in 1985. It is administered through the State Soil and

Water Conservation Committee in cooperation with the soil and water conservation districts. The purposes of this program are to reduce erosion, improve agricultural water quality, and improve forest resources. Funding is provided by the legislature with the cost-share for forestry practices set at 60 percent for 1985-86 (Alabama Agricultural and Conservation Development Commission 1985).

Controversy still remains about whether providing cost-shares to landowners discourages private investment or replaces it with taxpayers' money. Virginia's experience has been that the incentives programs stimulate owners to invest in reforestation and release. While dollars from incentives programs may partially replace private dollars, it appears that these programs encourage owners to increase the acreage treated and invest the same or more of their own money.

The major benefit is that many owners who would let their land go unmanaged and make no investment are

encouraged to put up their own money, along with the State's 50-percent share, toward the cost of appropriate forest management practices. The ultimate beneficiary is the public because of the future contribution to the local and State economies when the timber is harvested and manufactured (Stanley pers. communication, Graff pers. communication).

Virginia's Seed Tree Law

Complementing Virginia's incentives program is a seed tree law of long standing (1940). This law is effectively used to encourage the regeneration of pine stands after harvest. Under the law, the landowners must either leave pine seed trees or provide an alternate management plan that describes the practices that they will undertake to assure regeneration. This alternative is often site preparation and planting, though natural regeneration meets the requirements of the law if sufficient numbers of seedlings are established after the first full growing season. The personnel of the Virginia Department of

Forestry routinely note when final harvest cuts are made and contact owners to remind them of the requirements of the law.

This approach has been very effective, and the State rarely institutes legal actions for noncompliance. Forest

industries and other timber buyers cooperate closely with the department in bringing the law to the attention of owners and assisting them in providing for Virginia's future forests (Mills pers. communication).

Today's State Forestry Programs

State forestry organizations have continued to grow in the South, with fluctuations hinging on the year-to-year budgetary situation in individual States. Southern political leaders widely recognize the importance of forest resources and the contribution they make to the industrial base of every Southern State. The forestry-related sector of the economy ranks at or near the top southwide in terms of employment, value added in manufacture, and income (except in Oklahoma, where forests occupy a relatively small part of the State).

As the States have increased their programs, Federal funding has provided a smaller proportion of their financial support. The Federal role is still important because of the availability of technical staff to assist State personnel and to provide an umbrella of coordination among the varied programs, organizations, and agencies. Federal assistance is particularly important in insect and disease monitoring and control, and in regeneration and timber stand improvement, where most States have no financial incentives program and

depend upon the Forestry Incentives Program and the Agricultural Conservation Program. Funding for cooperative fire control, forest insect and disease control, and forest management and utilization is very important as a supplement to State funding. Losing Federal support would put a strain on most State organizations if they are expected to maintain present program levels.

The various Federal authorities for the cooperative programs with the States were legislated over more than 50 years. Responding to the need for consolidation, Congress passed the Cooperative Forestry Assistance Act of 1978 (P.L. 95-313). This brought together under one act programs for rural forestry assistance, forestry incentives, insect and disease control, urban forestry assistance, rural fire prevention and control, management assistance, planning assistance, and technology implementation. In this consolidation, the act clarified the scope of programs, established new authorization levels for

funding, and offered a consolidated payment option to the States to reduce the paperwork and delay associated with the then-current reimbursement procedures. Though funding for certain programs, such as the Forestry Incentives Program and the Rural Community Fire Program, is still included in Agriculture's appropriation rather than the Interior and Related Agencies bill (which contains the Forest Service appropriations), the authorities are now clear for administering the programs.

Rural Forestry Assistance

The technical assistance programs of the individual States vary to meet their needs, but all follow the same general pattern. Forest landowners can receive advice and technical assistance on the management of their forest lands. Professional foresters of the State forestry organization will visit the owner and make an inspection of the property as a basis for providing further help. Each State has guidelines that limit the activity and the time that can

be spent with any one owner. Where tract size and forest values are too large to be handled by the State "service forester," owners are referred to consultants.

Typical services provided to owners include the preparation of forest management plans, explanation of appropriate forest management activities, timber marking, marketing assistance, taxation advice on forestry operations, discussions of multiple-use aspects of land management, help with cost-share programs, and advice on forest products utilization. Technical experts are available to assist loggers and primary forest-products manufacturers in improving the efficiency of their operations protecting the environment.

Where vendors are not available, the State may provide at cost such services as site preparation, planting, herbicide application for release or timber stand improvement, and prescribed burning. Timber salvage programs following storms and insect epidemics usually

are handled by the service foresters.

State organizations are sensitive to the issue of competition with private enterprise and whenever possible encourage landowners to use consultants or outside vendors for their forestry needs (USDA Forest Service 1982 unpubl.).

Forestry Incentives

Besides giving technical advice and help to forest managers, service foresters administer the financial incentives programs. The Federal programs (Agricultural Conservation Program and Forestry Incentives Program) are available in all States. Virginia, North Carolina, South Carolina, Mississippi, Texas, and Alabama have a State-funded program. Details about Virginia's program were given earlier. The programs of the two Carolinas and Mississippi are similar and are supported in part by severance taxes. The Texas program is funded through a foundation

established by the Texas Forestry Association, which depends on contributions, primarily from forest-related industries, for support. Alabama funds its program directly with State appropriations.

Incentives programs have contributed greatly to the acreages planted to trees in the South. The largest single effort was the Soil Bank Program, which established over 1.9 million acres of tree plantations from 1956 to 1964. The latest 5-year data show that southern landowners annually planted an average of 29,211 acres under the Agricultural Conservation Program (1979-83) and 158,530 acres under the Forestry Incentives Program (1980-84). Total planting on nonindustrial private land averaged 452,837 acres annually.⁵ Acreages reforested under the State incentives programs have been increasing. Virginia's average annual area planted under reforestation tax

⁵ Data provided by USDA Forest Service.

funding during the same period was 16,874 acres. In 1983-84, however, Virginia planted 24,892 acres under its State program. South Carolina reported 4,906 acres of planting completed under its Forestry Renewal Program; Mississippi reported regeneration done on 30,114 acres under its Forest Resources Development Programs.

In addition to the direct financial incentives programs, other Federal tax-related actions have encouraged investments in reforestation. Under the provisions of the Revenue Act of 1978, cost-share payments may under certain conditions be exempted from Federal income tax. The Revenue Act of 1980 provided for investment tax credit and amortization of reforestation costs. Since the 1986 revision of United States tax laws, however, preferential capital gains treatment of timber income is no longer available to landowners.

Insect and Disease Control

The Forest Pest Control Act of 1947 gave the Forest Pest

Management Staff of the USDA Forest Service's State and Private Forestry Deputy area the responsibility for insect and disease control. This staff was responsible for pest control on the national forests, other Federal lands, and on State and private lands in cooperation with the States. The Forest Service provided training, technical assistance, and funds to detect and control forest insects and diseases. In recent years, the State responsibility has become more important, and the States have hired insect and disease specialists. The Forest Service's Forest Pest Management Staff works closely with State personnel and coordinates activities among States (Robbins 1985).

Several southern pests have inflicted significant damage over the years. Among diseases, fusiform rust infects 10 percent or more of loblolly and slash pines on 15 million acres. The stem cankers can kill trees outright or degrade their wood. At present the most effective measures are planting resistant species when possible, breeding rust-resistant strains of

susceptible pines, and early salvage in thinnings.

Another disease with high potential for damage is annosus root rot. It attacks and kills pines growing on deep, sandy, well-drained sites. Typically, annosus root rot occurs in thinned plantations on old-field sites. Treating stumps when the trees are cut can retard the disease. But once a site is infected, annosus is difficult to eliminate.

The most spectacular and serious of forest pests in the South is the southern pine beetle. It destroys merchantable-size timber and kills large areas of trees during epidemics. Populations tend to run in cycles and can increase or decrease sharply from year to year. For example, from 1979 through 1983, this pest killed an estimated 614.5 million cubic feet of loblolly and shortleaf pines. Of this, about 368.7 million cubic feet were salvaged, but much of the salvaged sawtimber went into pulp or the lumber was degraded because of stain associated with the beetle attack. During those 5 years, the amount of timber

killed annually ranged from 8 million to 236 million cubic feet (Hoffard 1985).

When southern pine beetle outbreaks are under way, the amount of timber needing immediate salvage is often greater than what can be logged or used at local mills. The State forestry organization is called upon to implement control measures and to coordinate salvage of dead and dying timber. This is a major task requiring the cooperation of landowners, loggers, mill operators, transportation facilities, and forest managers. In severe outbreaks, multi-State coordination is necessary. Timber markets may be disrupted over large areas, and salvaged timber is usually sold for a low stumpage price. Texas and Louisiana experienced a very severe outbreak in 1985.

The above pests—fusiform rust, annosus root rot, and southern pine beetle—are only three examples of the complexities that the States face in pest control. Each lends itself to integrated pest management, which requires the application of good forest management practices on

the ground throughout the life of the forest stand—not just when pest populations get out of hand. While the State is called upon to help when an outbreak occurs, the need for prevention and protection through management is ever present. State forest management personnel can give advice to landowners, but pest problems cannot be dealt with regionwide as long as a high proportion of the nonindustrial private forest stands go unmanaged. Though the States have increased their service forestry staffs in recent years, there are still inadequate numbers of foresters in most areas.

State pest-control staffs are called upon to identify and assist in the control of many insects and diseases besides those mentioned above. As more suburban homes are built on forested lands, the calls for assistance have greatly increased. Nursery operations often encounter insect and disease problems, some of which can wipe out thousands of seedlings in a few days. The State seed

orchard operations have also placed new demands on pest control staffs to deal with the cone and seed insects. These pests must be controlled to protect orchard investments and assure that genetically improved seed is produced and reaches the landowner as seedlings for reforestation.

From 1980 through 1984, the Southern States have spent an average of \$7,263,800 annually for forest insect and disease management. About one-third of that came from State funds, with the remainder from Federal sources. The amounts vary greatly depending on pest conditions from one year to the next (table 4).

Urban Forestry Assistance

Urban and community forestry is another area of responsibility recognized in recent years by the State Foresters. They provide technical assistance to help cities and towns inventory their tree resources and plan for establishment, protection,

Table 4—Forest Service and State expenditures for forest insect and disease management in the South, 1965-84

Year ³	Total		Forest Service ¹		State ²	
	Current dollars	1982 dollars ⁴	Current dollars	1982 dollars ⁴	Current dollars	1982 dollars ⁴
<i>Thousands</i>						
1965	615	2,189	484	1,722	131	466
1966	1,436	4,884	1,091	3,711	345	1,177
1967	1,551	5,085	1,195	3,918	356	1,164
1968	1,487	4,604	1,142	3,536	345	1,068
1969	1,687	4,991	1,139	3,370	548	1,621
1970	1,866	5,071	1,265	3,438	601	1,633
1971	1,848	4,643	1,312	3,296	536	1,347
1972	2,228	4,761	1,631	3,485	597	1,276
1973	4,471	9,143	3,419	6,992	1,052	2,151
1974	4,976	9,336	3,259	6,114	1,716	3,220
1975	5,696	9,399	3,282	5,416	2,414	3,983
1976	4,857	7,554	2,922	4,544	1,935	3,009
1977	5,347	7,738	3,192	4,619	2,155	3,119
1978	4,981	6,880	3,186	4,401	1,795	2,480
1979	5,232	6,708	3,717	4,765	1,515	1,942
1980	9,729	11,260	7,120	8,241	2,610	3,021
1981	7,843	8,317	5,701	6,046	2,142	2,271
1982	4,269	4,269	2,902	2,902	1,367	1,367
1983	6,476	6,393	4,044	3,992	2,432	2,401
1984	8,002	7,614	4,735	4,505	3,267	3,108

¹ Forest Service expenditures for technical assistance and control work on national forest, other Federal, and State and private lands.

² Expenditures by non-Federal agencies for State and private cooperative programs, as reported to the Forest Service.

³ Fiscal year.

⁴ Converted to 1982 dollars by dividing the expenditures in current dollars by the implicit price deflators for gross national product for total Federal Government purchases of goods and services from 1965-71 and for nondefense Federal Government purchases of goods and services from 1972-84, as reported by the U.S. Department of Commerce, Bureau of Economic Analysis.

Note: Data may not add to totals because of rounding.

and replacement of trees to improve the community environment. Urban foresters work with developers and builders to help retain healthy trees and to design developments that take advantage of existing tree cover. Such activities increase property values and provide a more livable environment.

State forestry staffs are often called on to help diagnose and solve urban tree problems. Where cities and towns are big enough to support their own staff forester or arboriculturist, the State organization provides technical help and coordination with other programs.

Rural Fire Prevention and Control

Fire protection is still the largest program in every State forestry organization. Programs have been expanded and modernized; however, the vagaries of weather make fire risks and preparation for fire protection a very difficult planning and management task.

Looking at the South's incendiary history, it appears that fire damage has stabilized. When the fire-cause records are examined, it is immediately evident that most fires in the South are caused by people, accidentally or on purpose. Thus, a very important part of fire protection is the prevention activity carried out continuously in every State. Education of the public at all ages is a continuing task. The Forest Service's Smokey Bear Program and other activities focus on children in school. Advertising in all forms of the media and informational articles in newspapers and magazines have been the stock in trade of State forest-fire prevention activity for all age groups. More effort is needed to understand the human-caused fire problem and to develop ways to correct it.

Fire programs have several objectives directed at prevention and control of wildfire and the use of prescribed fire as a management tool. Until the late 1930's, fire programs concentrated on the total elimination of fire from

southern forests; prevention through education was high on all State activity lists. In the late 1930's, authorities began to recognize that the prevention and quick suppression of fires had resulted in a massive buildup of fuels and that when wildfires did occur, they did much greater damage and were more difficult to handle.

Gradually, educational programs were modified and demonstrations conducted to show the need for prescribed fire, not only for fuel reduction but also for disease control and the improvement of wildlife habitat.

Change was slow but successful. State organizations now provide assistance to landowners in prescribing and using fire as a management tool (Hartman 1949). While all the States have laws which permit the entry of private property for the purpose of fighting wildfire, Florida has gone one step further in legislating authority for the Division of Forestry to enter private lands to ignite prescribed burns, for the purpose of

reducing hazardous accumulation of wildland fuels if the owner does not object. In the 1977-78 season, 13,000 acres were burned in Florida on absentee ownerships. This activity has led to increased requests from landowners for assistance in prescribed burning (Wade 1979).

The success of the fire prevention and control programs can be judged by comparing over several years the records of acreages protected and the percentage of that acreage that burns each year (Swager and others 1958 unpubl.). Table 1 provides information on expenditures, acres protected, and acres burned since the first Southern States began fire-control programs in 1916. Though the fire situation varies widely from year to year, average figures provide a good measure of performance of the State forestry organizations. During the twenties and thirties, the percentage of forested acreage burned southwide often ran 5 to 10 percent. Today, that figure is consistently below 0.5 percent.

The State forestry organization also administers the rural community fire program. Rural fire departments are organized and trained to meet local needs. Equipment is provided to the limits of funds available. Usually communications and personal protective equipment receive high priority. Excess Federal vehicles and equipment available for loan from the USDA Forest Service are rebuilt or modified as needed and provided to these fire departments. Local fire departments are often integrated into the State forest fire organization to provide early attack and mutual assistance in fire control.

Every State in the South has laws concerning arson and fires resulting from carelessness. Rewards are now offered in many places for information leading to the arrest and conviction of arsonists. However, arson still accounts for 48 percent of wildfires in the South.

There is little doubt that the success of reestablishing the South's forests and industrial development based on that

forest resource are the result of successful fire prevention and suppression programs organized and carried out by the States. Very early it was recognized that fire destroyed not only standing timber but more importantly seedlings and trees still too small for market. W.W. Ashe recognized this and described the consequences of fire in his 1895 bulletin. Fire prevention and control was and remains the key to successful regeneration of the South's cutover lands. Fire protection allows abandoned agricultural land to regenerate to pine and protects seedlings until they are large enough to stand limited burning (Ashe 1895). Fire protection was the principal task of the State forestry organizations in their early years. The South's "third forest" was the result of fire protection, a service needed and provided by the States (Peters 1 :3 and 1922, Artman and Dean 1945, Bruner 1928).

State Forest Resource Planning

The Forest and Rangeland Renewable Resources

Planning Act of 1974 (RPA) was another major piece of Federal legislation that has had a significant impact on State forestry organizations. This act and subsequent amendments call for the Forest Service to make an assessment of all the forest and rangeland and related resources of the Nation at 10-year intervals. Based on this assessment, a program of action is to be prepared which responds to the national needs identified.

While the Forest Service is in the best position to plan programs for the national forests, it was evident early on that State and private interests must be involved with regard to programs to provide for the needs of non-Federal lands and the management and utilization of their resources. The logical step was to seek the cooperation of the States by encouraging and assisting them in the preparation of a forest resource plan for each State.

The Cooperative Forestry Assistance Act of 1978 clarified authority for Federal assistance to States in planning, and Congress

made a small appropriation. State and Forest Service personnel in the South held meetings to coordinate the effort and to seek some general agreement on the scope and content of the State plans. Each State's first step included identifying a planner and developing a steering or advisory committee with representatives of the agencies and groups who had an interest in the State's forest situation. The implementation of these committees varied widely, but the primary responsibility for the planning task was assigned to the State Forester. During the last 5 years, each Southern State has completed a State forest resource plan. A new round of planning is under way in several States.

The scope of the State plans varies, but the general format involves identifying forest resources goals or issues of greatest importance to the State's future. The States consider each goal or issue in terms of its importance and their capability to deal with it. In many of the plans, responsibility for leadership is considered and the

agencies and groups who can best support the achievement of particular goals or solution to problems are identified. Some of these program elements may not involve the State forestry organization directly, but they are important to the overall success of the total forestry effort.

In the past, State policymakers had not looked at the roles of many State organizations in the context of the overall State economy and social structure. The planning process provides an opportunity to establish clearly the relationships between the forest resources, the State forestry organization, and other areas such as State policies, taxation as it affects management and utilization, foreign trade, employment in service industries, housing costs, water and air quality, recreational values, etc. No longer are plans confined simply to the programs and budgets of the organization for day-to-day operations. In several States, the Governor's involvement in the planning process has added strength and political credibility to the resulting plan.

These State plans are used as input for the national RPA Program, which is presented to Congress by the President with his statement of policy. Past administrations have made little use of the RPA Assessment and Program in preparing their budget requests, but despite this lack of influence on the Office of Management and Budget and the White House, RPA efforts have been useful to Congress and other interested persons in identifying the needs of the Nation.

Environmental Programs

State organizations have become involved in several regulatory programs, with responsibilities varying among States. With regard to water quality, State forestry organizations have participated in the development of Best Management Practices to protect water quality during forestry operations. This is a voluntary program, but oversight is provided by State personnel to assist in training loggers and others carrying out on forest lands

practices that may degrade water quality.

Many State personnel have also been trained to be certified pesticide applicators. This assures that advice, assistance, and services they provide will be in compliance with both State and Federal laws and the pesticides used will be in accordance with the label requirements and restrictions.

A third environmental area in which State forestry organizations are involved is air quality, specifically in smoke management from prescribed fire, smoke from wildfire, and spray drift from pesticide applications.

Several States have developed guidelines for use in preparing prescriptions for controlled burning. The guidelines are tied to the needs of local areas and to the local weather forecast to assure that smoke will dissipate quickly without posing a visibility hazard on highways or airfields. Smoke in heavily populated areas is avoided, too.

State forestry organizations are also monitoring stations

that measure atmospheric deposition and ozone levels.

"Free" Public Assistance

The controversy over providing free (that is, tax-supported) public assistance and financial incentives to private landowners is still alive after 75 years. The debate focuses on three basic points. First is the policy of spending public funds to assist individual landowners in management and partial financing of forestry practices such as planting and timber stand improvement. Second is the question of whether the investment of these funds provides a reasonable return for the public good. Third is the question of whether the Government's providing free services deprives the private enterprise forester of work and income. More recent is the related question of whether the availability of financial assistance reduces the investments made by nonindustrial landowners. Each of these questions has been argued many times with various data. Four studies merit attention in the context of these questions.

Mills and Cain (1979) studied the financial efficiency of the 1974 Forestry Incentives Program using a 9-percent sample (1,433) of the 15,849 assistance cases. Their analysis showed that the financial returns on the investment and the total yield increases were high on the average. But, as with any new program that is broadly applied, they noted that some segments of the program did not provide good returns. The benefit/cost ratio for the whole program using a discount rate of 6 3/8 percent was 5.6. Of the individual cases nationwide, 75 percent earned at least that. Southern cases did better. The weighted average internal rate of return was 10.2 percent. Mills and Cain also offered several recommendations for improving the efficiency of the program.

Cubbage, Skinner, and Risbrudt (1985) made an economic evaluation of the Georgia rural forestry assistance program. They matched pairs of harvesting operations where one landowner had received assistance from the State's

service forester and the other had received no assistance. Their field crews "cruised" harvested areas to determine numbers of stumps, trees, saplings, and seedlings, and damage to trees. In the 17 pairs of stands examined in the upper Piedmont of Georgia, the differences were striking. The personal characteristics of the owners did not differ greatly between groups. Those assisted received higher stumpage prices: \$108 per thousand board feet vs. \$66 per thousand board feet. They cut smaller volumes per acre: 1,135 cubic feet vs. 1,485 cubic feet. They had greater volumes per acre remaining: 810 cubic feet vs. 226 cubic feet. The present net values per acre at a 4-percent discount rate were \$1,563 for the assisted owners and \$940 for the owners receiving no assistance. The authors concluded that the technical assistance provided was effective in improving forest management practices, and that it was economically efficient. The tax dollars attributed to harvesting assistance exceed the cost of marking the timber to be sold but not the entire

program cost; Federal returns were greater than State returns.

Royer and Kaiser (1975) reported a southwide study of the influence of professional foresters on pine regeneration. (The study was based on a sample taken by the Statistical Reporting Service in the Census of Agriculture.) They selected 759 landowners who had harvested at least 4 acres of pine between 1971 and 1981. The data were obtained by interviews in all 12 States. It was found that the owners made regeneration investments on 63 percent of the acres harvested when a professional forester had been consulted. Only 12 percent of the acres had a regeneration investment if no forester was involved. The study noted that professional foresters were consulted about only 37 percent of the pine stands harvested. This points to an obvious need to expand professional landowner assistance from all possible sources if the long-range supply of southern pines is to be enhanced.

In another study, Royer (1985 unpubl.) looked at the effects of markets and public policies on reforestation decisions by landowners. His study is based upon the 251 cases from the above study where the landowner used a final harvesting method. The analysis, a hierarchical analysis using logistical regression, examined four sets of variables: characteristics of the forested parcel, personal (owner) characteristics, market (economic) variables, and public policy (institutional) variables. Royer examined the relationship of these variables to find whether or not the owner had actively managed his or her harvested site for pine by planting or seeding following harvest or by using a seed-tree cut as the method of harvest. Royer found that only 16 percent of the variation in behavior could be explained by ownership and personal characteristics; another 13 percent could be explained by market forces; but 60 percent could be explained by policy influences, particularly cost-share funds and technical assistance. The remaining 11 percent was unexplained in the

analysis. This study further confirms that the availability of technical and financial assistance is a positive factor in encouraging landowners to manage their lands and regenerate them to pine when appropriate, and is much more important than market forces.

The rural forestry assistance programs of the State forestry organizations provide that opportunity to encourage and assist landowners to manage their lands. This is particularly true on the smaller ownerships, where the landowner's knowledge

about potential returns would not be enough to encourage him or her initially to employ a consultant. The information on the management and productivity of southern forests makes it quite clear that there need to be more contacts between professional foresters and forest landowners before the latter make decisions on harvesting. The State Forester is in the best position to lead the way, but the cooperation and help of all other forestry interests must be brought to bear simultaneously on the problem.

Looking Ahead

With its predominance of privately owned forest land, the South is recognized as the Nation's future leader in timber production. Already, the finest examples of intensive forest management come from the South. Forest industry lands are generally well managed and set examples for nonindustrial landowners. The South leads the Nation in establishing forest plantations on private lands. Forest industries in the region are planting about as many acres as other private landowners.

Hardwoods are in good supply and will continue to be abundant for several decades before predicted demand approaches growth. Pine growth is now ahead of harvest southwide. In some counties, however, the harvest is exceeding growth, which results in a reduction of the total volume of growing stock.

Natural succession of plants replaces pine with hardwoods on most sites in the long run. If management fails to recognize this potential problem when pine stands are harvested, pine sites are often converted by nature to hardwood stands, frequently

of the less desirable species. The failure of pine growth to exceed harvest in the future will rest upon the failure of the private landowner to properly regenerate pine stands after harvest today.

Also, if Americans want their forests for uses other than timber, they must provide management and protection to achieve those objectives. Multiple use is mandated by law on public lands and should be the fundamental approach to forest management on all ownerships. With modest adjustments in activities, owners can enhance wildlife habitat, increase water yields if desired, and provide recreational opportunities, while at the same time supplying wood for local and industrial needs. The South's forests will continue to be a mainstay in the economy, both in providing income to the forest owner and in providing an industrial base and employment for the region. The potential of increasing export markets provides additional opportunities and strength to southern forestry.

The South is in its present favorable position because

of the efforts of the State forestry organizations over the last 50 to 60 years. First came fire protection to allow the establishment of regeneration on cutover lands and on abandoned agricultural lands. Then came assistance with reforestation by producing and distributing seedlings, educating the public to understand the importance of forests, protecting the forests from insects and disease, and providing technical assistance to landowners, loggers, and producers of forest products.

State forestry organizations have played a very important

role in the economic revival of the South and will continue to lead the way through programs that encourage and assist nonindustrial private landowners to manage their forest land for their own purposes. Those same private purposes will provide public benefits to the region now and into the future.

The State Foresters are leaders in the South. As the value of the region's forests increases, and as the demand on the timber increases, protection and management must also be increased.

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